IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

FELLOWSHIP FILTERING TECHNOLOGIES, LLC, ***Plaintiff,*** **v.** **YANDEX N.V., YANDEX, LLC, AND YANDEX, INC.,** ***Defendants.***	**Civil Action No._____** **JURY TRIAL DEMANDED**

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Fellowship Filtering Technologies, LLC ("Fellowship Filtering" or "Plaintiff"), by and through its attorneys, brings this action and makes the following allegations of patent infringement relating to U.S. Patent No. 5,884,282 ("the '282 patent"). Defendants Yandex N.V., Yandex LLC, and Yandex, Inc. (collectively, "Yandex" or "Defendant") infringes Fellowship Filtering's '282 patent in violation of the patent laws of the United States of America, 35 U.S.C. § 1 *et seq*.

INTRODUCTION

1. In an effort to expand its product base and profit from the sale of infringing computer-based data analytics technologies, Yandex has undertaken to copy the technologies and inventions of Gary Robinson, the inventor or the '282 patent and a co-owner of Fellowship Filtering.

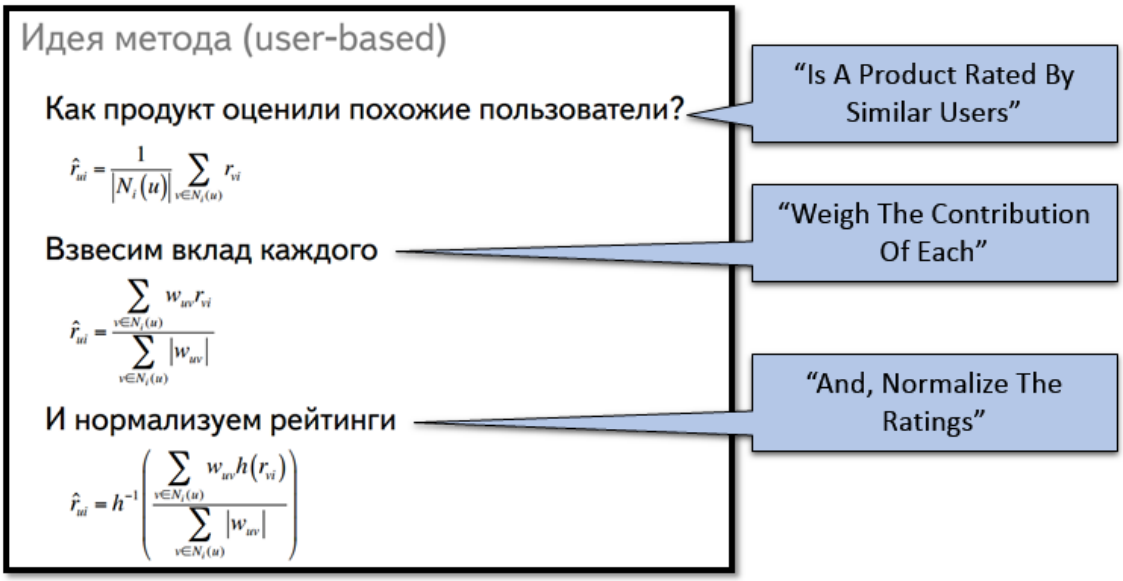
2. Yandex positions its data analytics systems as providing advertisers and end users with revolutionary mechanisms of gaining insights into customer behavior. Yandex's data analytics systems incorporate the inventions disclosed in Mr. Robinson's '282 patent.

3. Executives from Yandex have stated that provision of accurate recommendations is central to their business "Персонализация — это ответы на вопросы: Что? Кому? Как? Когда? [Personalization is the answer to the questions: What? Who? How? When]."[1]

4. Yandex software developers have described personalization systems that incorporate Mr. Robinson's inventions (disclosed in the '282 patent) as providing techniques that improve the functioning of computer systems and providing answers to business problems that would have previously been unavailable to users.

> ***Recommender systems are known to significantly improve user experience and the key quality metrics of such services. My talk describes our unified approach to recommendation.*** We present an extensible model that supports different domains, content features, external data both for users and items, and real-time learning. It uses both collaborative filtering and content-based algorithms, combining them via Yandex's well-known algorithm MatrixNet.

Michael Roizner, *Yandex Recommender System Summary*, PRESENTATION AT YANDEX SCHOOL OF DATA ANALYSIS CONFERENCE (2015), available at: https://yandexdataschool.com/conference/2015/program/roizner (emphasis added).



Andrey Danilchenko, разработчик, Яндекс [Yandex, Developer], Введение в рекомендательные системы [Introduction to Recommender Systems] at 13 (November 12, 2013)

[1] Павел Алёшин, руководитель Яндекс.Маркета [Pavel Aleshin, Head of Yandex.Market], Использование больших данных в интернет-ритейле [Using Large Data in Online Retail] at 8, Presentation from the 2015 Customer Experience Forum in Moscow, Russia (October 28, 2015), event program available at: http://www.customer-management.ru/2015/program.

(Document from Yandex software developer describing the steps undertaken for generating recommendations using collaborative filtering. The blue annotations are translations of the Russian text provided by Fellowship Filtering.)**.**

5. Mr. Robinson is a mathematician and inventor of computer-based recommendation engine technologies that enable the recommending of products and/or content based on novel algorithms that calculate the preferences based on the similarity and dissimilarity of users of a website.

6. Mr. Robinson studied mathematics at Bard College and New York University's Courant Institute of Mathematical Sciences. Mr. Robinson is the recipient of the National Science Foundation – SBIR award.

7. Mr. Robinson is a named inventor of numerous United States Patents. Mr. Robinson's patents have been acquired by companies including Google, Inc. ("Google").[2] Patents referencing Mr. Robinson's '282 patent have been purchased or assigned to companies including: International Business Machines Corporation ("IBM"),[3] Google,[4] Amazon.com, Inc. ("Amazon"),[5] and Intel Corporation ("Intel").[6]

ROBINSON'S LANDMARK ELECTRONIC MAIL INVENTIONS

8. The Robinson Method, named after Gary Robinson, is a Bayesian statistical approach that uses a text-classifier, rule-based method for determining the relevancy of an email message. Numerous leading SPAM filtering technologies utilize the Robinson Method.[7]

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[2] *See* USPTO Assignment Abstract of Title Database Reel/Frame No. 021552/0256.
[3] U.S. Patent Nos. 6,356,879; 6,931,397; 7,006,990; 7,080,064; 7,099,859; 7,389,285; 7,885,962; 8,700,448; and 8,825,681.
[4] U.S. Patent Nos. 7,966,632; 8,290,964; and 8,762,394.
[5] U.S. Patent Nos. 6,266,649; 7,113,917; 7,433,832; 7,478,054; 7,664,669; 7,778,890; 7,908,183; 7,921,042; 7,945,475; 8,001,003; 8,024,222; 8,108,255; 8,140391; and 8,180,689.
[6] U.S. Patent Nos. 6,405,034, 7,590,415, and 7,797,343.
[7] Ricardo Villamarín-Salomón & José Carlos Brustoloni, *Bayesian Bot Detection Based on DNS Traffic Similarity,* in SAC'09: ACM SYMPOSIUM ON APPLIED COMPUTING 2040—41 (2009); Masahiro Uemura & Toshihiro Tabata, *Design and Evaluation of a Bayesian-filter-based Image Spam Filtering Method*, in PROCEEDINGS OF THE 2008 INTERNATIONAL CONFERENCE ON INFORMATION SECURITY AND ASSURANCE 46-51 (2008) ("the Robinson Method"); MARCO ANTONIO BARRENO, Technical Report No. UCB/EECS-2008-63, EVALUATING THE SECURITY OF MACHINE LEARNING ALGORITHMS 45 (2008); Manabu Iwanaga et al., *Evaluation of Anti-Spam*

9. Mr. Robinson's contributions to the field of electronic mail filtering are recognized as landmark technologies.

> Robinson Fisher Method: With the Robinson Fisher method, Gary Robinson developed a more sophisticated way to ensure sensitivity for both recommendations and rejections. Consequently, the Robinson Fisher approach replaced the Geometric Means proposal. To formulate two null hypotheses one must assume ideal conditions, i.e. that token frequencies are pairwise independent, not uniformly distributed, and that the description consists of a random set of tokens. We then calculate a score

Günther Hölbling, PERSONALIZED MEANS OF INTERACTING WITH MULTIMEDIA CONTENT 119 (2011).

10. Mr. Robinson has published academic articles on statistical approaches to identifying content. A 2003 article in Linux Journal described these mathematical approaches for identifying unsolicited bulk email. Mr. Robinson's approach was notable because it assigned scores to both "spam" and "ham" and used an algorithm to guess intelligently whether an incoming email was spam. This approach was incorporated in products such as SpamAssassin, which used a Bayesian statistical approach using a text-classifier rule to distinguish "spam" and "ham" messages.[8] "Beginning from the publication of Gary Robinson in some filters (for example, Spam Assassin) there came to be used the method of overlapping probabilities."[9]

11. Mr. Robinson's inventions relating to filtering technologies have been widely adopted by spam filters including Spam Assassin[10] (PC Magazine's Editor's Choice for spam

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Methods Combining Bayesian Filtering and Strong Challenge and Response, in PROCEEDINGS OF CNIS'03 (COMMUNICATION, NETWORK, AND INFORMATION SECURITY) 214—19 (2003); BLAINE NELSON, Technical Report No. UCB-EECS-2010-140, BEHAVIOR OF MACHINE LEARNING ALGORITHMS IN ADVERSARIAL ENVIRONMENTS 62-67 (2010); Gordon V. Cormack & Mona Mojdeh, *Autonomous Personal Filtering Improves Global Spam Filter Performance*, in PROCEEDINGS OF THE 6TH CONFERENCE ON EMAIL AND ANTI-SPAM 2 (2009).

[8] Gary Robinson, *A Statistical Approach to the Spam Problem*, LINUX JOURNAL 107 (2003).

[9] Saadat Nazirova, *Survey on Spam Filtering Techniques*, in COMMUNICATIONS AND NETWORK Vol. 3 at 153 (2011).

[10] *SpamAssassin Pro*, in PC MAGAZINE February 25, 2003 at 82 (awarding SpamAssassin Pro its editors' choice award); *The SpamAssassin Project: Train SpamAssassin's Bayesian Classifier,* http://spamassassin.apache.org/full/3.2.x/doc/sa-learn.html ("Gary Robinson's f(x) and combining algorithms, as used in SpamAssassin"); *Credits - The Perl Programming Language - Algorithms*, http://cpansearch.perl.org/src/JMASON/Mail-SpamAssassin-3.2.5/CREDITS ("The Bayesian-style

filtering), SpamSieve[11] (MacWorld's Software of the Year), and SpamBayes[12] (PC Worlds Editor's Choice for spam filtering).

ROBINSON'S DEVELOPMENT OF CONTENT FILTERING SYSTEMS

12. Prior to developing groundbreaking electronic mail filtering technologies, Mr. Robinson used his insights to develop the automated content filtering technologies that are used today by Yandex and many of the world's largest corporations without attribution or compensation.

13. In the late 1980's, Mr. Robinson developed a system for collecting preference information and providing recommendations. His company, 212-ROMANCE, was an automated, voice-based dating service that used a passive data collection process to determine likely romantic matches.[13] Mr. Robinson's contributions to the field of content filtering were pioneering.

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text classifier used by SpamAssassin's BAYES rules is based on an approach outlined by Gary Robinson. Thanks, Gary!").

[11] David Progue, *From the Deck of David Progue: The Follow-Up Edition*, N.Y. TIMES, April 5, 2006, http://www.nytimes.com/2006/04/05/technology/06POGUE-EMAIL.html ("Spam Sieve is just incredibly, amazingly accurate; my in box is clean, baby, clean!").

[12] Tom Spring, *Spam Slayer: 2003 Spam Awards*, PCWORLD MAGAZINE, December 15, 2003, at 36 ("What makes the program unique is that SpamBayes doesn't use predetermined spam definitions. Rather, it constantly evolves by scanning your in-box to build custom definitions."); MARCO ANTONIO BARRENO, Technical Report No. UCB/EECS-2008-63, EVALUATING THE SECURITY OF MACHINE LEARNING ALGORITHMS 45 (2008) ("SpamBayes classifies using token scores based on a simple model of spam status proposes by Robinson . . . . SpamBayes Tokenizes the header and body of each email before constructing token spam scores. Robinson's method assumes that each token's presence of absence in an email affects that email's spam status independently from other tokens.").

[13] 212-Romance was incorporated under the name Microvox Systems, Inc.

Boston Business Journal

Few people in the technology industry can say they once ran a successful dating service. Even fewer can say that the dating service led to the creation of a technology used by everyone from the digital music industry to the largest corporations in the world.

But Gary Robinson, chief executive of Bangor-based Transpose LLC, can say that.

Matthew French, *Romantic Beginnings Have Worldwide Effect*, BOSTON BUS. J., May 20, 2002.

14. In the mid-1990s, Mr. Robinson recognized that the growing adoption of the internet and increased computational power enabled collection and processing of data relating to customer and user preferences that, with proper data analytics processes, could provide accurate recommendations of products and content.

15. Mr. Robinson further recognized that the growth of the internet led to unique problems involving information overload that filtering techniques using specific new collaborative filtering technologies could solve.

16. At the time, existing recommendation technologies, discussed in the '282 patent, failed to teach a robust and accurate process for providing recommendations. A key insight of Mr. Robinson was that the input of buying habits and/or ratings information from multiple users over the internet allowed similarity values among users to be calculated based on identifying subgroups of similar users.

17. Mr. Robinson invented an automated collaborative filtering ("ACF") system that received and stored data based on internet users' purchasing history, preferences, and/or buying history. When a new user accessed the ACF system through a website (in one embodiment), the ACF system recommended further content (*e.g.*, products) based on the similarity values for the first user as compared with other users that previously provided preference data to the ACF system.

18. Mr. Robinson worked to develop novel systems and processes designed to provide accurate content and product recommendations using data stored, collected, and computed on specific computer-based systems. Mr. Robinson's insights led to the patent application resulting in the '282 patent.

19. The patent-in-suit - the '282 patent - is a pioneering patent in the field of data analytics. The '282 patent uses novel algorithmic approaches to provide accurate recommendations of products and content using data analysis specific to a computer system.

> good. The creative license for statistical filtering really belongs to hackers like Paul Graham, Gary Robinson, and Bill Yerazunis and the rest of the community that has invented many of these approaches. Some companies have claimed the technology as their own, which gives people the idea that any other solutions are nonstandard, when it's really borrowed technology.

Jonathan A. Zdziarski, ENDING SPAM: BAYESIAN CONTENT FILTERING AND THE ART OF STATISTICAL LANGUAGE CLASSIFICATION 269 (2005).

20. The '282 patent has been cited by over 444 United States patents and patent applications as prior art before the United States Patent and Trademark Office.[14] Companies whose patents cite the '282 patent include:

- OpenText S.A.
- Accenture Global Services GMBH
- YellowPages.com LLC
- Nielsen Holdings N.V.
- International Business Machines Corporation
- Koninklijke Philips N.V.
- Google, Inc.
- Amazon.com, Inc.
- Microsoft Technology Licensing LLC
- Arbor Networks, Inc.
- Johnson & Johnson Consumer Companies
- S.C. Johnson & Son Inc.
- Sony Electronics, Inc.
- Infosys Ltd.
- Parasoft Corporation
- AT&T Intellectual Property LLP

[14] The 444 forward citations to the '282 patent do not include patent applications published by the United States Patent and Trademark Office or patent applications that were abandoned prior to publication in the face of the '282 patent.

- Dish Network LLC
- eBay, Inc.
- Rovi Corporation
- CBS Interactive, Inc.
- American Express Company
- Hewlett-Packard Company
- Xerox Corp.
- Capital One Financial Corporation
- JDA Software Group, Inc.
- State University of New York
- Robert Bosch Healthcare System, Inc.
- Netflix, Inc.
- Intel Corporation
- Tribune Media Company
- Ingenio, LLC
- Recommend, Inc.
- Dassault Systemes S.A.
- Pandora Media, Inc.
- Pace plc
- Regents of the University of California
- Facebook, Inc.
- Numera, Inc.

21. Patents citing Mr. Robinson's '282 patent as prior art have been asserted by Amazon.com, Inc. ("Amazon") and Netflix, Inc. ("Netflix") in patent infringement cases:

- Amazon asserted U.S. Patent No. 6,266,649, entitled "Collaborative Recommendations Using Item-to-Item Similarity Mappings," against Discovery Communications, Inc. ("Discovery"). The '649 patent claimed a priority date of September 1998 (subsequent to the '282 patent). Amazon's '649 patent cited Mr. Robinson's '282 patent as prior art during prosecution before the Patent and Trademark Office. After two years of litigation, Discovery took a license to Amazon's '649 patent (prior to claim construction being adjudicated).[15]
- Netflix asserted U.S. Patent No. 7,024,381, claiming a priority date of April 2000, against Blockbuster LLC ("Blockbuster"). The '381 patent referenced the '282 patent as prior art. A settlement and license agreement was reached between Netflix and Blockbuster on the verge of trial.[16]
- Robert Bosch Healthcare Systems, Inc. ("Robert Bosch") asserted U.S. Patent Nos. 7,223,235 & 7,223,236 against MedApps, Inc. ("MedApps"). The '235 and '236 patents

[15] *Amazon.com Inc. v. Discovery Communications Inc.*, Case No. 09-cv-00681 Dkt. Nos. 122 & 166 (W.D. Wash.).
[16] *Netflix, Inc. v. Blockbuster, Inc.*, Case No. 06-cv-02361 Dkt. No. 239 (Cal. N.D.).

cite Mr. Robinson's '282 patent as prior art. MedApps reached a settlement and license with Robert Bosch roughly one year after the infringement action was initiated.[17]

- Black Hills Media LLC ("Black Hills") asserted U.S. Patent Nos. 8,028,323, 8.230,099, and 8,458,356. The '323, '099, and '356 patents referenced Mr. Robinson's '282 patent as prior art. Black Hills settled a majority of its cases following denial of summary judgment of invalidity.[18]
- i2 Technologies, Inc. ("i2") asserted U.S. Patent No. 7,370,009 against Oracle in the Eastern District of Texas. Subsequently, Oracle asserted four patents against i2's parent, JDA Software Group. Following a year of litigation, the parties reached a settlement in March 2011.[19]

22. Cases against Oracle, Discovery and Blockbuster underscore the inventive nature of the '282 patent, as the above asserted cases involve patents referencing Mr. Robinson's '282 patent as prior art.

23. The claims in the '282 patent are directed at solving a problem that did not arise in prior art systems, *i.e.* generating preference data from large data sets. In prior art systems, the sample size of users was typically very small, and thus the need for a process that takes into account unusual similarities was not at issue. There is no question pre-electronic recommendation systems are significantly different from computer and/or internet-based recommendation systems. The speed, quantity, and variety of rating information markedly differ from the objectives and data available to recommendation systems existing before modern, computer and/or internet-based systems. Differences between the analog versions of preference systems and the invention disclosed in the '282 patent diverge significantly.

24. The use of ratings data and probability values to make recommendations over a computer network was not a longstanding or fundamental economic practice at the time of the invention disclosed in the '282 patent. Nor at the time was the use of ratings data and probability values to make recommendations a fundamental principle in ubiquitous use on the internet or

[17] *Robert Bosch Healthcare Systems, Inc. -v- MedApps, Inc*. Case No. 12-cv-00113 Dkt. No. 64 (Cal. N.D.); US. Patent No. 8,028,323 Information Disclosure Statement (March 3, 2010).
[18] *Black Hills Media LLC v. Sonos, Inc*., Case No. 14-cv-00486 Dkt. Nos. 129 & 169 (Cal. C.D.).
[19] *i2 Technologies, Inc. et al v. Oracle Corporation et al.*, Case No. 10-cv-00284 Dkt. Nos. 85 & 130 (E.D.Tex.) (i2 asserted several predictive analytics patents against Oracle); Erin Coe, *I2, Oracle Resolve Software Patent Battle*, LAW360, March 4, 2011, http://www.law360.com/articles/229787/i2-oracle-resolve-software-patent-battle.

computers in general. Dr. Zeynep Tufekci of Harvard University's Berkman Center for Internet and Society described recommendation engine systems such as the systems disclosed in the '282 patent as being far from a "law of nature."

> The fear I have is that every time this is talked about, people talk about it as if it's math or physics, therefore some natural, neutral world. And they're programs! They're complex programs. ***They're not like laws of physics or laws of nature. They're created by us.***[20]

25. The '282 patent discloses how interactions with the internet are manipulated to yield a desired result—a result that overrides the routine and conventional sequence of events ordinarily triggered by requesting content or a product that is relevant to a user of a website.

26. And the use of probability values in collaborative filtering (as in the '282 patent) to control for generally popular content and/or products is important and offers something more than a collaborative filtering system that fails to control for the general popularity of content and/or products.[21] Data scientists at Hulu, LLC (operator of a streaming video website) described the importance of accounting for general popularity of a given item:

> Just because a recommendation system can accurately predict user behavior does not mean it produces a show that you want to recommend to an active user. For example, "Family Guy" is a very popular show on Hulu, and thus most users have watched at least some episodes from this show. These users do not need us to recommend this show to them — the show is popular enough that users will decide whether or not to watch it by themselves. Thus, ***novelty is also an important metric to evaluate recommendations***.[22]

27. Presentations from Yandex have identified a critical drawback in many recommendation systems is the failure to account for "popularity bias."

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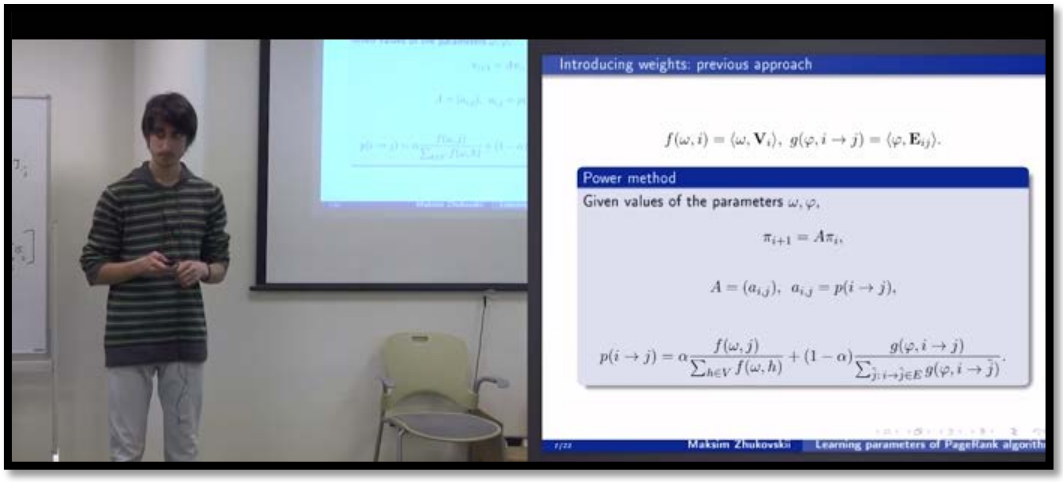
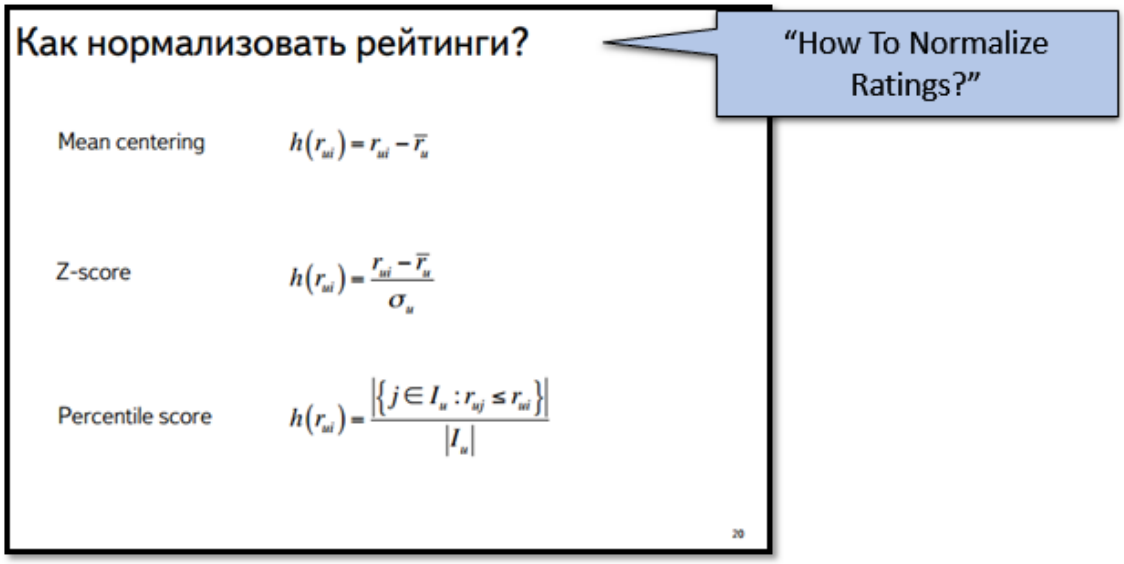
[20] *What Makes Algorithms Go Awry?*, NATIONAL PUBLIC RADIO, ALL THINGS CONSIDERED, June 5, 2015, http://www.npr.org/sections/alltechconsidered/2015/06/07/412481743 (emphasis added) (the quotation is from an interview with Dr. Tufekci).

[21] Michael Roizner, head of the recommendation systems software development group at Yandex, in his discription of the Yandex Recommendation System stated, "We also compare average features of an item." Michael Roizner, *Yandex Recommender System* (October 23, 2015), available at: https://www.youtube.com/watch?v=VgioTyMyJus. Historical Agrregates are also generated by the Yandex Recommender System. These historical aggregates comprise averages for items in the system such as "average clicks historically." *Id*.

[22] Liang Xiang, Hua Zheng & Hang Li, *Hulu's Recommendation Engine*, HULU TECH BLOG, Sept. 19, 2011, http://tech.hulu.com/blog/2011/09/19/recommendation-system/ (emphasis added).



Обучение параметров PageRank в задаче ранжирования веб-страниц [Training options in the PageRank ranking of Web pages], YANDEX YOUTUBE.COM CHANNEL at 6:30 (April 10, 2015) (This presentation from Mr. Zhukovsky on the page rank system and options used by Yandex describes the use creating averages to control for popularity for a page to generate a more accurate recommendation. For example, in many applications some features are distributed irregularly which may lead to disproportional differences in ranking scores of neighboring items.).



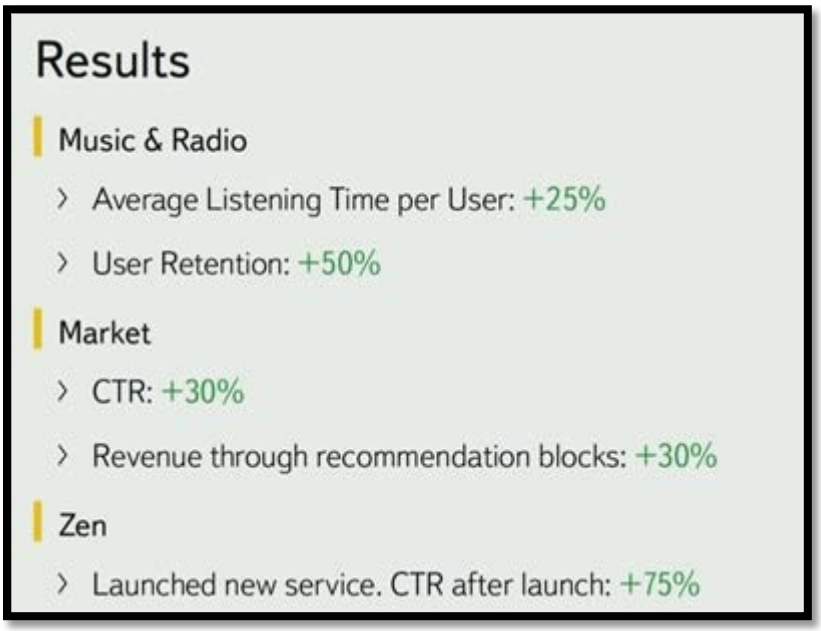
Andrey Danilchenko, разработчик, Яндекс [Yandex Developer],Рекомендательные системы [Reference System] at 20 (November 16, 2015) (Document from Yandex developer Andrey Danilchenko describing the steps undertaken for generating recommendations where ratings are normalized. The blue annotations are translations of the Russian text provided by Fellowship Filtering.).[23]

[23] *See also Next-Generation Product Recommendations*, ORACLE WHITE PAPER 6 (March 2011) ("They tend to over recommend popular items because they are clicked on more often. This would be the equivalent of an in-store sales associate only recommending items on the end-caps and never looking at merchandise on the upper shelves in the aisles—often the items that are most difficult to find.").

28. Ten years after Gary Robinson conceived of the inventions in the '282 patent, a 2005 White Paper from Oracle, entitled "The Art of Personalization," described the use of collaborative filtering to provide recommendations as "new technology" and a "breakthrough:"

> Collaborative filtering is relatively ***new technology that can deliver better results***. Just go to the leading Web sites that offer "recommendations" and you notice the value. After purchasing a book on *Learning to Golf*, you later return to the Web site and find other books on *Greatest Golf Courses* and *Golf Tips from the Pros*. These recommendations seem relevant, timely, and yet sometimes simplistic. Often you'll see other *Learn to…* books and videos, like *Learn to Ski*, *Learn to Play Tennis*, and *Learn to Sew*. Compared to past manual attempts at personalization and "e-expectations," this is a ***breakthrough***.[24]

29. The adoption of personalized search by Yandex has been described as directly increasing website traffic and leading to "impressive results." "Here are some impressive results from applying our system in production we improved the key metrics for these services. We launched a new service 'zen' based entirely on recommendations."[25]



Id.

[24] CHARLES BERGER, ORACLE WHITE PAPER: THE ART OF PERSONALIZATION 4 (August 2005) (emphasis added).

[25] Michael Roizner, *Yandex Recommender System Summary*, PRESENTATION AT YANDEX SCHOOL OF DATA ANALYSIS CONFERENCE (2015), available at: https://yandexdataschool.com/conference/2015/program/roizner.

THE PARTIES

30. McKinney, Texas based Fellowship Filtering is committed to advancing the current state of technology in the field of predictive analytics systems. In addition to the ongoing efforts of Mr. Robinson, Fellowship Filtering employs a McKinney, Texas resident as a Technology Analyst. Fellowship Filtering is a Texas limited liability company with its principal place of business at 6851 Virginia Parkway, Suite 214, McKinney, Texas.

31. Fellowship Filtering is a small, Texas-based company. Fellowship Filtering depends on patent protection to effectively license its innovative technologies and build its business.

32. Fellowship Filtering, like Yandex, relies on its patent rights to protect its intellectual property.

> We rely on a combination of patents, trademarks, trade secrets and copyrights, as well as nondisclosure agreements, to protect our intellectual property rights. . . Any significant infringement of our intellectual property rights could harm our business, our brand and/or our ability to compete, all of which could adversely affect our competitive position, our business, financial condition and results of operations.

Yandex N.V., Annual Report on Form 20-F at 20 (April 30, 2015).[26]

33. On information and belief, Defendant Yandex N.V. is a public company with limited liability incorporated in the Netherlands. Yandex N.V.'s registered office is at Schiphol Boulevard 165, 1118 BG, Schiphol, Netherlands. Together with its wholly-owned subsidiaries, Yandex Inc. and Yandex LLC, Yandex N.V. operates websites (e.g., yandex.com, yandex.ru, yandex.st, and yandex.net).

34. Yandex N.V. has engaged in business with numerous United States companies, including Mozilla, Facebook, Twitter, Visa, Warner Music, EMI and Universal Music, among others. With regard to Mozilla, located in Mountain View, California, Yandex states that, "Our two largest distribution partners in 2011, Mozilla and Opera, accounted in aggregate for 58% of our distribution costs in 2011 and 57% in 2010."[27]

35. On information and belief, Yandex N.V. operates data centers in the United States that offer the infringing recommendation technology to customers in this district. "We note your disclosure that you operate data centers in and around Moscow, Amsterdam and Las Vegas."[28]

36. On information and belief, Yandex N.V. has designated Yandex Inc. as its agent for process of service in its SEC filings.

37. Yandex N.V. has the right to control Yandex, Inc.'s activities.[29]

38. Defendant Yandex LLC is a Russian limited liability company. Yandex LLC, was formed in 2000, as a wholly owned subsidiary of Yandex Group's former Cypriot parent company.

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[26] *See also* Yandex N.V. Annual Report on Form 20-F at 20 (April 30, 2015) ("A number of internet, technology, media and patent-holding companies own or are actively developing patents covering search, indexing, electronic commerce and other internet-related technologies, as well as a variety of online business models and methods. We believe that these parties will continue to take steps to protect these technologies, including, but not limited to, seeking patent protection in certain jurisdictions.").

[27] YANDEX FORM F-1 FILING at 58 (April 28, 2011).

[28] Craig D. Wilson, *Correspondence from the Securities and Exchange Commission to Yandex N.V.*, FORM 20-F FOR THE FISCAL YEAR ENDED DECEMBER 31, 2012 – FILE NO. 001-35173 (September 24, 2013).

[29] *Perfect 10, Inc. v. Yandex N.V.*, Case No. 12-01521 Dkt. No. 73 (September 4, 2012) ("Per Yandex N.V.'s articles of incorporation, the executive director of Yandex N.V. is able to control the "day-to-day management of [Yandex N.V.] or *any Subsidiary.*").

In 2007, Yandex undertook a corporate restructuring, as a result of which Yandex N.V. became the parent company of the Yandex group of corporate entities.

39. Defendant Yandex LLC was registered to do business in California until October 19, 2010. The internet registrations of Yandex.com and Yandex.ru are held by Yandex LLC. Yandex LLC also holds the internet registration for the tweededtimes.com, a website written in English which deals almost exclusively with U.S. celebrities and U.S. media, which is hosted by Yandex Inc. According to publicly-available information, either Yandex LLC or Yandex N.V., or both, has entered into numerous contracts with U.S. companies, including Amazon, Apple, EMI, Facebook, Google, Infospace, MasterCard, Microsoft, Mozilla, SPB Software, Twitter, Universal Music, Warner Music, Visa (to process credit card advertising payments), among others. Upon information and belief, the contracts with Google, Infospace, Microsoft, Mozilla and Twitter, involve the exchange of Internet traffic between Yandex LLC or Yandex N.V. (or both) and those entities. On information and belief, Yandex servers in the United States are used for storing, serving ads, and providing infringing product and webpage recommendation technologies.

40. Defendant Yandex, Inc. is a Delaware Corporation that maintains offices in Newburyport, Massachusetts. It hosts the infringing website Yandex.com, the English speaking version of the website Yandex.ru. Yandex, Inc. was first registered to do business in the state of Massachusetts on November 26, 2001. *See Yandex Inc. Articles of Organization*, Massachusetts Corporations Division Website (Filed November 26, 2001). Subsequently, Yandex, Inc. was organized under the state of Delaware with its principal place of business at 38 Merrimac St., Suite 201, Newburyport, Massachusetts 01950. *See* Yandex, Inc. Foreign Corporation Certificate No. 101140062240, Massachusetts Corporations Division Website (Filed April 8, 2011).

41. On information and belief, Yandex, Inc. has designated the Corporation Trust Company as its registered agent and can be served at: the Corporation Trust Company, Corporation Trust Center, 1209 Orange St., Wilmington, Delaware 19801.

42. On information and belief, Yandex, Inc. operates offices in the state of California, including offices located at 299 California Ave, #200, Palo Alto, CA 94306.

43. On information and belief, Yandex, Inc. is the owner of SPB Software, Inc. SPB is headquartered in Nevada and "offers a full suite of mobile solutions including a mobile user interface engine for smartphones and tablets."[30]

44. On information and belief, former and current employees of Yandex are located throughout the United States, making Texas a particularly central location for the litigation of Yandex's patent infringement. John Adams Dowdy III who served as President, Treasurer, Secretary, and Vice President of Yandex, Inc.[31] is currently a resident of the State of Florida.[32] Preston Carey who has served as U.S. & U.K. Business Development Director at Yandex since 2010,[33] is located at 38 Merrimac St., Suite 201, Newburyport, Massachusetts.[34]

45. Yandex markets infringing recommendation technologies to customers in the United States including in this district.

> Yandex.Market, aims to accommodate the needs of international retailers wishing to sell their products to Russian customers by utilising all the benefits of a technologically advanced platform. Yandex.Market offers international web stores an opportunity to showcase their offers and to target those customers who look to buy products specifically outside of Russia. . . . Dozens of retailers, including China's LightInTheBox and DHGate, Germany's Kidsroom.de and Witt International, a US website RevolveClothing, and Italian Yoox, are already offering their products to Russian consumers via Yandex.Market, and we are developing new functionality that would facilitate increased access to international retailers.

Yandex N.V., Annual Report on Form 20-F at 52 (filed April 30, 2015).

> Yandex.Market, a leading comparison shopping service, is in a position to accommodate the needs of international retailers wishing to sell their products to Russian customers by utilising all the benefits of a technologically

[30] *Yandex Acquires Mobile Developer SPB Software*, YANDEX PRESS RELEASE (November 28, 2011), available at: https://company.yandex.com/press_center/press_releases/2011/2011-11-28_1.xml

[31] *John Dowdy Biography*, MHG Website (last visited December 5, 2015), available at: http://www.mhgbio.com/about-mhg/the-mhg-executive-team-leadership-logistics-and-discovery/

[32] *Id*.

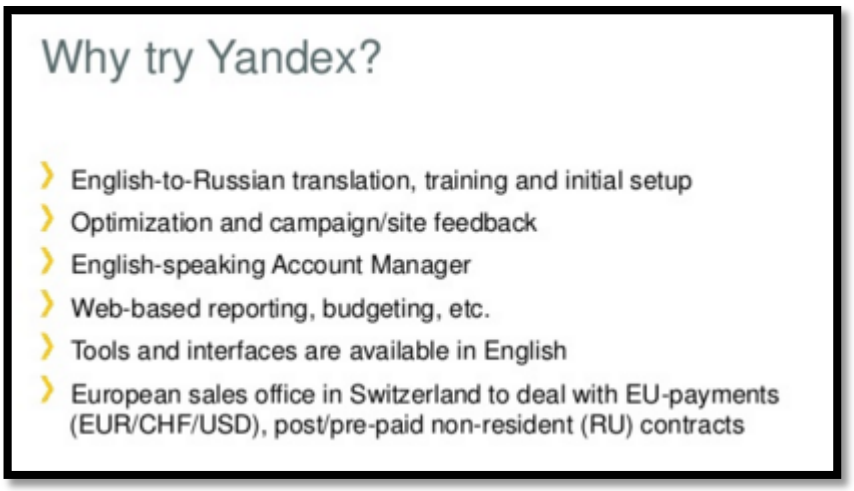
[33] *Preston Carey Biography*, Yandex Company Website (last visited December 5, 2015), available at: https://company.yandex.com/general_info/management_team/carey.xml.

[34] *See Annual Report of Yandex, Inc., Filing No. 201536132090*, Massachusetts Secretary of State (filed on June 29, 2015).

> advanced platform with over 16,000 stores, 68 million product offers and 22.3 million unique visitors per month (December 2014, comScore Media Metrix). Now, ***international web stores have an opportunity to showcase their offers on Yandex.Market to target those customers who look to buy products specifically outside of Russia***.

Yandex.Market Helps International Retailers Reach Russian Consumers, YANDEX COMPANY BLOG (March 30, 2015) (emphasis added).

46. Yandex's Director of Business Development, Preston Carey has solicited business from customers located in the United States and specifically in this district through trumpeting Yandex's infringing recommendation technology.

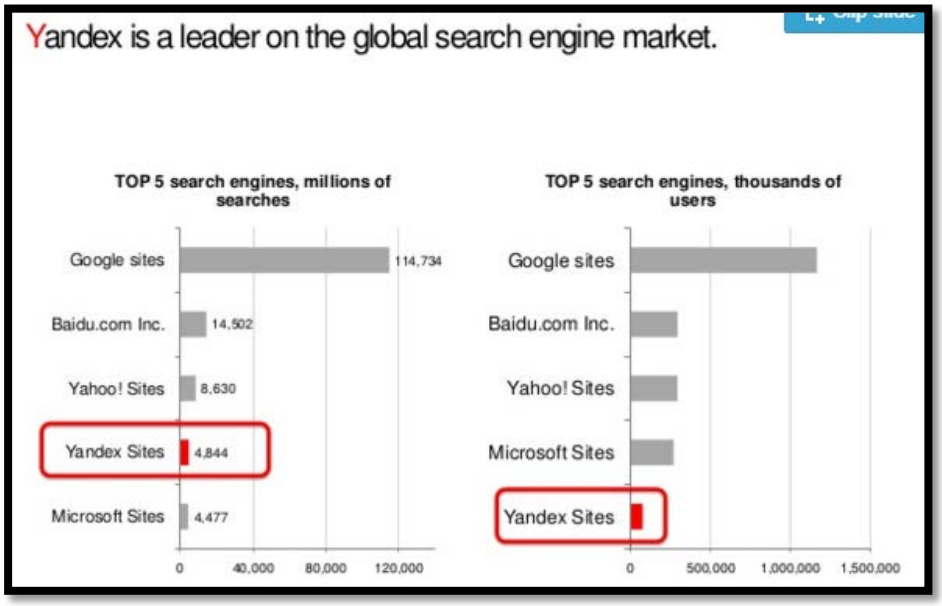


Preston Carey, AN OVERVIEW OF YANDEX AND THE RUSSIAN INTERNET MARKET at 46 (August 2014), available at: http://www.slideshare.net/YandexBusDev/yandex-overview.

47. Yandex has trumpeted its global reach and presence in the United States as a reason for advertisers in the United States to purchase advertising on its websites and mobile applications – all of which use the infringing recommendation technology.

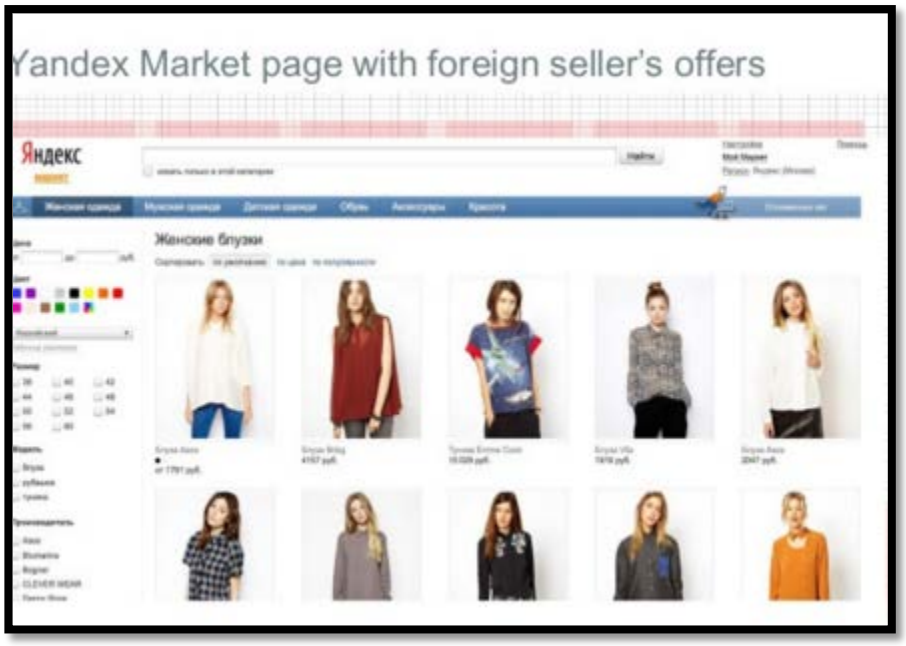
Id.

48. Yandex repeatedly states in presentations to United States based investors and customers that it is a company with "global reach."



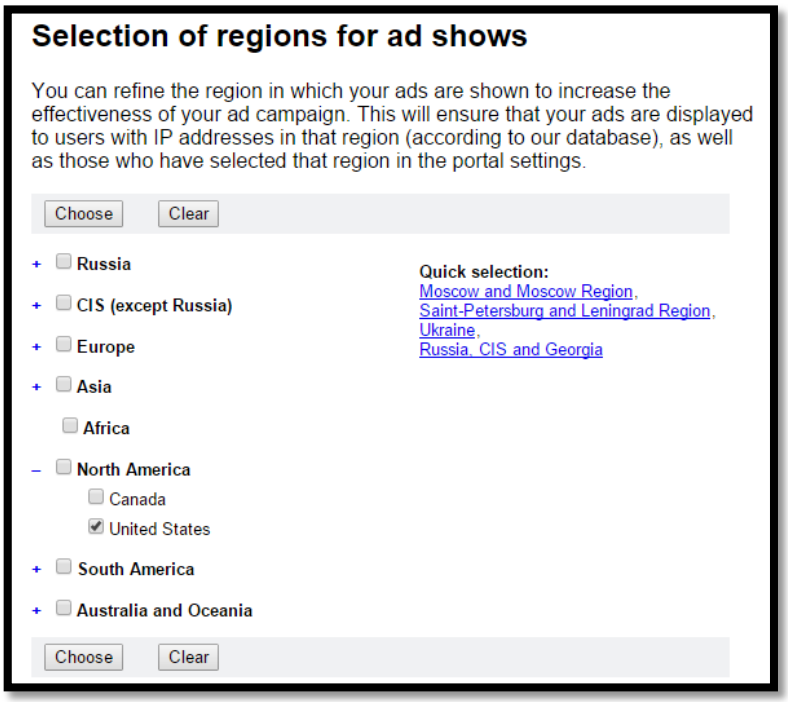
Preston Carey, EVERYTHING WILL BE FOUND: RUSSIAN INTERNET MARKET AND YANDEX OVERVIEW at 11 (August 8, 2013), available at: http://www.slideshare.net/YandexBusDev/russian-market-andyandexoverviewpresentation.

49. Yandex has specifically marketed its infringing recommendation technology to customers located in the United States as illustrated in the below slide from a 2014 presentation from Yandex Director Preston Carey.



Preston Carey, YANDEX.MARKET OVERVIEW at 33 (March 2, 2014), *available at:* http://www.slideshare.net/YandexBusDev/yandexmarket-overview.

50. Yandex enables its customers to target advertising and product recommendations based on a user being located in the United States (including in the Eastern District of Texas). The below screenshot of Yandex's advertising tool "Yandex Metrica" shows that advertisers can target recommendations based specifically on a user being located in the United States.



Yandex Metrica, Geographic Selection, YANDEX WEBSITE (last visited December 7, 2015), available at: https://metrica.yandex.com/.

51. On information and belief, Yandex in July 2012 sold its subsidiary Face.com. Inc. to Facebook, Inc.

> In July 2012, we completed the sale of our ownership interest in Face.com, Inc. (formerly Vizi Information Labs Ltd.) to a subsidiary of Facebook, Inc. for cash consideration of $5.7 million and 142,479 shares of Facebook, of which we sold 93,971 shares in 2013 and 48,508 shares in 2014.

Yandex N.V., Annual Report on Form 20-F at 76 (April 30, 2015).

52. On information and belief, Yandex.ru which is operated by Yandex had 505,206 unique visitors from the United States in the 30-day period from November 3, 2015, to December 3, 2015.[35] Yandex.ru was the 19th most visited website in the world based on unique visitors during the month of November 2015.[36]

[35] *Alexa Website Traffic Report*, ALEXA.COM WEBSITE (last visited December 3, 2015), available at: http://www.alexa.com/datalab/screener.
[36] *Id.*

53. On information and belief, Yandex.com, which is operated by Yandex had 243,338 unique visitors from the United States in the 30-day period from November 3, 2015, to December 3, 2015.[37]

54. On information and belief, Yandex Inc. owns at least 8,000 I.P. addresses and operates at least 28 web crawlers for Yandex.com.

55. According to Yandex's website, Yandex offers infringing products for sale throughout the United States and Canada, including in the Eastern District of Texas. Further, Yandex advertises its infringing products throughout the Eastern District of Texas and claims financial benefits through its conducting of business in Texas.

JURISDICTION AND VENUE

56. This action arises under the patent laws of the United States, Title 35 of the United States Code. Accordingly, this Court has exclusive subject matter jurisdiction over this action under 28 U.S.C. §§ 1331 and 1338(a).

57. Upon information and belief, this Court has personal jurisdiction over Yandex in this action because Yandex has committed acts within the Eastern District of Texas giving rise to this action and has established minimum contacts with this forum such that the exercise of jurisdiction over Yandex would not offend traditional notions of fair play and substantial justice. Defendant Yandex, directly and through subsidiaries or intermediaries (including distributors, retailers, and others), has committed and continues to commit acts of infringement in this District by, among other things, offering to sell and selling products and/or services that infringe the '282 patent.

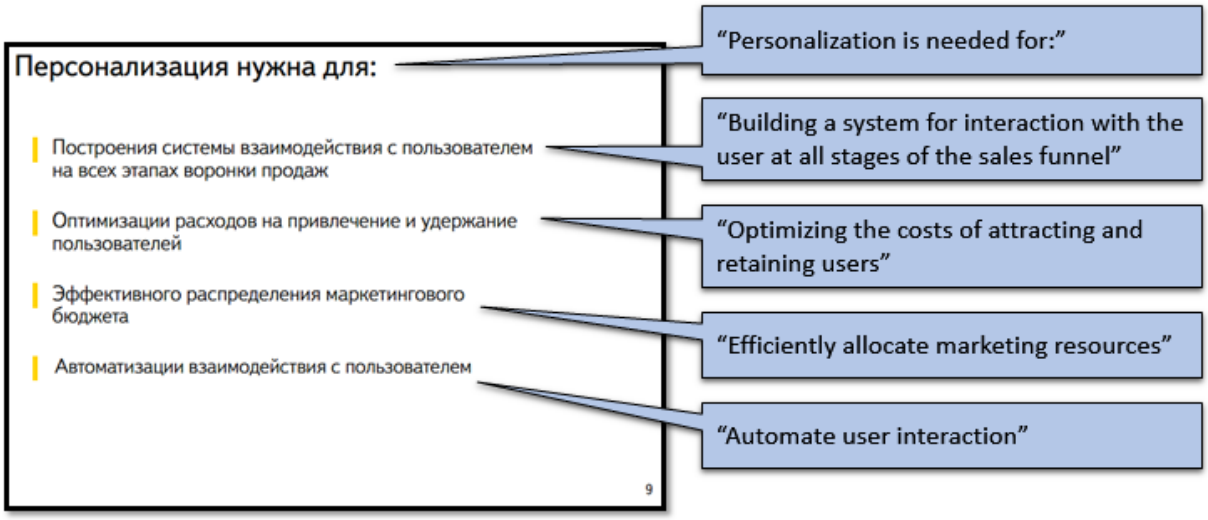
58. Venue is proper in this district under 28 U.S.C. §§ 1391(b), 1391(c) and 1400(b). Defendant Yandex, has transacted business in the Eastern District of Texas and has committed acts of direct and indirect infringement in the Eastern District of Texas.

[37] *Id*.

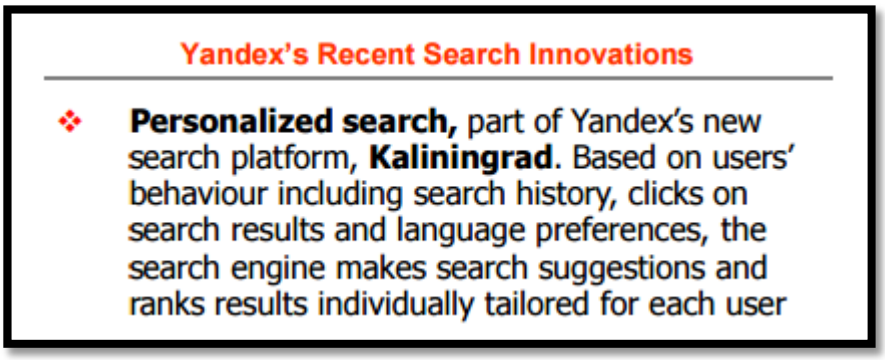
TECHNOLOGY BACKGROUND

59. Advances in computational power and the explosive growth of the internet have led to the development of data analytics systems for accurately recommending content and products to internet users. The '282 patent teaches specific automated collaborative filtering ("Automated CF" or "ACF") technologies for recommending products and content to users of the internet.

60. Yandex developers have confirmed the value of the inventions disclosed in the '282 patent – accurate personalization and product and webpage recommendations.

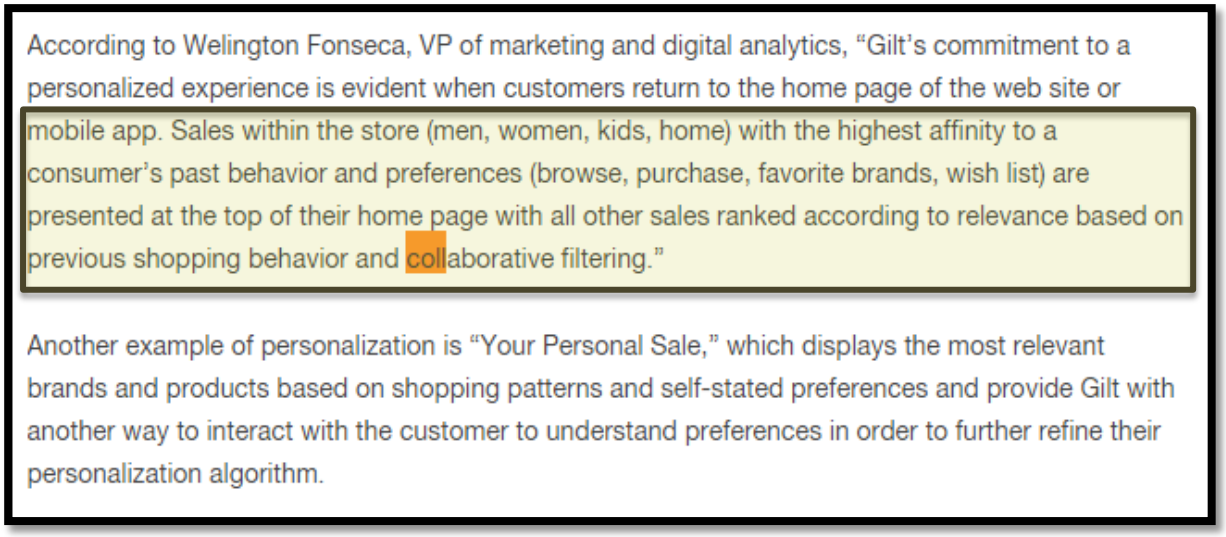


Павел Алёшин, руководитель Яндекс.Маркета [Pavel Aleshin, Head of Yandex.Market], Использование больших данных в интернет-ритейле [Using Large Data in Online Retail] at 9, Presentation from the 2015 Customer Experience Forum in Moscow, Russia (October 28, 2015).



Yandex Presentation, JEFFERIES 2013 GLOBAL TECHNOLOGY, MEDIA & TELECOM CONFERENCE at 8 (May 8, 2013).

61. Yandex's competitors have confirmed the importance and value of collaborative filtering systems to providing accurate recommendations.



According to Welington Fonseca, VP of marketing and digital analytics, "Gilt's commitment to a personalized experience is evident when customers return to the home page of the web site or mobile app. Sales within the store (men, women, kids, home) with the highest affinity to a consumer's past behavior and preferences (browse, purchase, favorite brands, wish list) are presented at the top of their home page with all other sales ranked according to relevance based on previous shopping behavior and collaborative filtering."

Another example of personalization is "Your Personal Sale," which displays the most relevant brands and products based on shopping patterns and self-stated preferences and provide Gilt with another way to interact with the customer to understand preferences in order to further refine their personalization algorithm.

Eman Roman, *Why You Need Human Data for Real Customer Engagement*, SAP BUSINESS INNOVATION BLOG, February 27, 2015, http://blogs.sap.com/innovation/sales-marketing/why-need-human-data-customer-engagement-02271337 (emphasis added).

62. Although content and product recommendations on websites are commonplace today, at the time the inventions disclosed in the '282 patent were conceived, an advanced system for recommending products and content automatically utilizing variables (*e.g.*, multiple users, product ratings, purchase history, and/or actions of website users) was novel.

63. Yandex repeatedly states, in filings with the United States Patent and Trademark Office that data analytics systems such as those taught in the '282 patent are unique to a networked computer environment and the internet.

> Today's large data centers manage collections of data comprising billions of data items. In such large collections, searching for particular items that meet conditions of a given search query is a task that consumes a significant amount of computing resources.

U.S. Patent App. 14/423,554, *Computer-Implemented Method Of And System For Searching An Inverted Index Having A Plurality Of Posting Lists* (filed February 25, 2013; published July 2, 2015).

> One advantage of the technology disclosed in the present specification over the prior art is that it improves the user experience when navigating Internet resources. And this improvement is provided via an optimization of the access to particular Internet resources, which is not dependent of a specific

> implementation of the Internet resources. For example, in the context of a web site, the navigation is improved by providing an optimization of the access to particular web pages of the web site, which is not dependent of a specific implementation of the web site.

U.S. Patent App. 14/433,026, *Method and System For Navigating To A Sub-Resource Of An Internet Resource* (filed on October 1, 2013; published October 1, 2015) (assigned to Yandex Europe AG).

64. Yandex has identified the efficient identification of data for making product recommendations as providing meaningful improvement to the functioning of computer systems.

> [T]here is a need for an effective mechanism for analyzing browsing logs to determine the intent or goals of Web searches of users. . . . smoothing and generalization of click data through a query-flow-graph, session-oriented evaluation of search engine performance, ***improving the accuracy of targeted advertisements and improving accuracy in the modeling of a user's behavior. Those of skill in the art will appreciate other uses and benefits of the present invention.***

U.S. Patent No. 8,938,408, *Systems and Methods for Classification and Segmentation of Browsing Logs Based on User's Search Goals* (issued January 20, 2015) (assigned to Yandex Europe AG) (emphasis added).

65. The advent of networked computers presented new and unique challenges in finding information as Yandex stated in a recent patent office filing.

> [T]he sheer breadth of information available on the Internet can make it challenging to find a specific resource among the estimated tens of billions of web pages in existence today.

U.S. Patent App. 14/243,199, *Method Of And System For Displaying A Plurality Of User-Selectable Refinements To A Search Query* (filed on April 2, 2014; published January 1, 2015) (assigned to Yandex Europe AG).

66. Controlling for popularity in making recommendations has been identified by corporations as providing a material improvement over the prior art.

> One of my favorite books is a tale of two cities. It was the best of times. It was the worst of times. This could describe the world we live in today. Anytime you transition from one to another, there is winners and there is losers. It is the best of times for some it is the world of times for others. It is the best of times for Amazon, Apple, QUALCOMM, and Uber.

Vivek Ranadivé, *TUCON 2013*, INTRODUCTORY REMARKS AT TIBCO ANNUAL USER CONFERENCE, December 5, 2013, https://www.youtube.com/watch?v=UnpVDtrvj8E.

67. The claims in the '282 patent describe a solution that is unquestionably rooted in computer technology to overcome a problem specific to and characteristic of computer networks.

> Today increasing numbers of people are turning to computational *recommender systems*. ***Emerging in response to the technological possibilities and human needs created by the World Wide Web***, these systems aim to mediate, support, or automate the everyday process of sharing recommendations.[38]

68. The Tapestry system, developed in 1992, introduced the idea (and terminology) of collaborative filtering.[39] Tapestry was developed at Xerox's Palo Alto Research Center and was directed to electronic mail filtering. Tapestry was based on identifying relevant email content based on exploiting explicit feedback (ratings and annotations) of other users. Tapestry stored the contents of messages, along with metadata about authors, readers, and responders. It allowed any user to store annotations about messages, such as "useful survey" or "Gary should see this!" Tapestry users could form queries that combined basic textual information (*e.g.*, contains the phrase "recommender systems") with semantic metadata queries (*e.g.*, written by Gary OR replied to by Joe) and annotation queries (*e.g.,* marked as "excellent" by Chris).

69. The development of the first collaborative filtering system was directly motivated by the need to sort electronic content transmitted over the internet (*e.g.*, electronic messages posted to newsgroups). "The motivation for Tapestry comes from the increasing use of electronic mail, which is resulting in users being inundated by a huge stream of incoming documents."[40]

70. Although widely adopted today, in the 1990's, collaborative filtering was a groundbreaking technology offering significant benefits over existing recommendation systems that were content based ("content-based filtering"). Content-based filtering made

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[38] Loren Terveen & Will Hill, *Beyond Recommender Systems: Helping People Help Each Other*, in HCI IN THE NEW MILLENNIUM 2 (Jack Carroll, ed., Addison-Wesley, 2001) (emphasis added).
[39] David Goldberg, David Nichols, Brian M. Oki, & Douglas Terry, *Using Collaborative Filtering to Weave an Information Tapestry*, COMMUNICATIONS OF THE ACM 35 No. 12, 61–70 (1992) (One of the first uses of the term "collaborative filtering" can be found in this paper.).
[40] *Id*.

recommendations based on the content of a document. The creators of Tapestry described this break from prior systems:

> Collaborative filtering is ***novel because it involves the relationship between two or more documents***, namely a message and its reply, or a document and its annotations. Unlike current filtering systems, Tapestry filters cannot be computed by simply examining a document when it arrives, but rather require (potentially) repeatedly issuing queries over the entire database of previously received documents. This is because sometime after a document arrives, a human (say Smith) may read that document and decide it is interesting. At the time he replies to it (or annotates it), you want your filter to trigger and send you the original document.[41]

71. Tapestry illustrates the limitations present in systems contemporaneous to the '282 patent. Tapestry lacked the ability to recommend content automatically based on similarities between users. Instead, the Tapestry system worked by recommending content based on predefined filters set by a second user.[42] For example, if a user wanted to prioritize messages relating to "Bakersfield, California" the system would return all messages that had previously been "tagged" by prior users as relating to "Bakersfield, California."

72. The below images show the Tapestry system prioritized content based on users requesting content previously tagged by another user of the Tapestry system.

[41] *Id*. at 61 (emphasis added).
[42] The Tapestry system was similar in many ways to Mr. Robinson's earlier 1980's matching system utilized in the Relationship Matching Service.

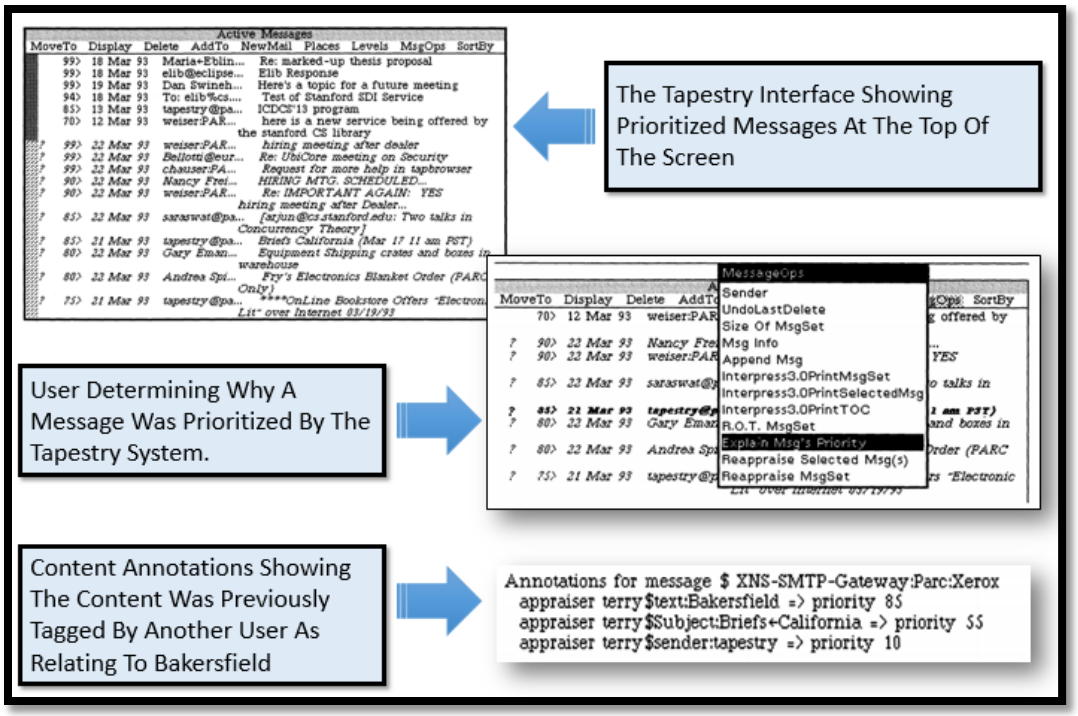

Fig. 1 (images of the Tapestry System (explanation added in blue)).[43]

73. Another early collaborative filtering system contemporaneous to the '282 patent was GroupLens. Started in 1994 by researchers at the Massachusetts Institute of Technology and later the University of Minnesota, the GroupLens system implemented a collaborative filtering system for rating Usenet newsgroup articles.[44] To make personalized predictions identifying the most useful Usenet articles to a user, the GroupLens system asked each user to enter a 1 to 5 rating after reading an article. GroupLens collected the ratings data in a database and compared these ratings to find users who shared similar tastes. Users of GroupLens were then provided a predictive rating for unread Usenet articles. The predictive rating was based on other users who shared similar taste with the user.

[43] Douglas B. Terry, *A Tour Through Tapestry*, in PROCEEDINGS OF THE CONFERENCE ON ORGANIZATIONAL COMPUTING SYSTEMS 21-30 (Simon Kaplan ed. 2003).
[44] Paul Resnick et al., *GroupLens: An Open Architecture for Collaborative Filtering of Netnews*, in PROCEEDINGS OF ACM 1994 CONFERENCE ON COMPUTER SUPPORTED COOPERATIVE WORK 175—86 (1994).

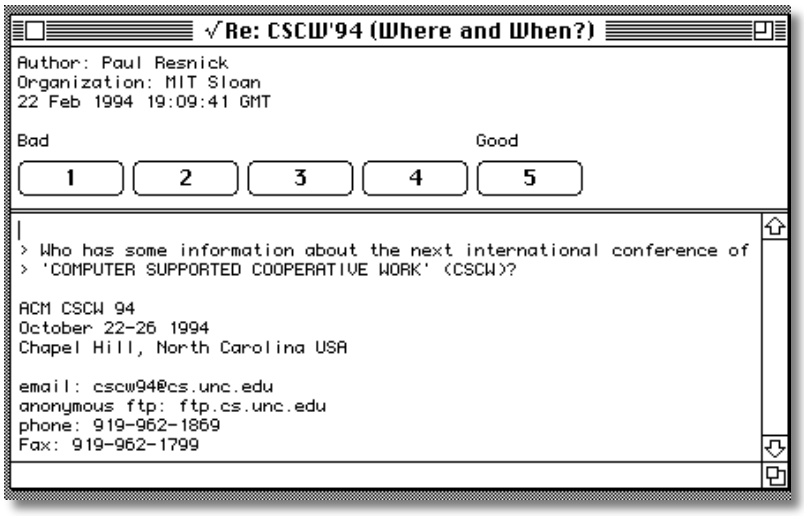

Fig. 2 (showing the user interface for GroupLens and the ability to rate articles 1-5).[45]

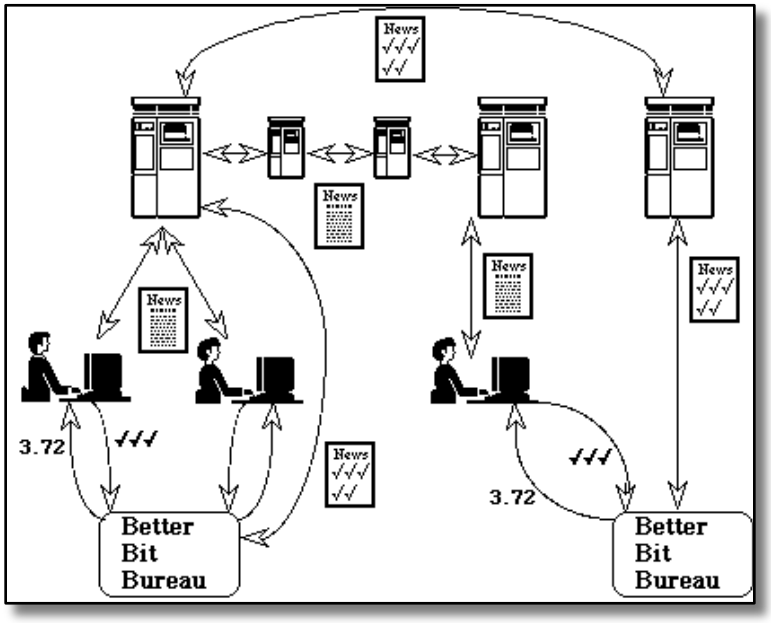

Fig. 3 (showing the architecture of the GroupLens system).[46]

74. GroupLens illustrates limitations in automated filtering systems contemporaneous to the '282 patent. The GroupLens system used the Pearson correlation to calculate similarities between users and used the similarities between users to generate predictive ratings. The Pearson correlation coefficient is calculated by comparing ratings for all items rated by both the target user

[45] *Id*. at Fig. 3.
[46] *Id*. at Fig. 2.

and the neighbor (*e.g.*, correlated items). The equation below gives the formula for the Pearson correlation between user "u" and neighbor "n," where CRu,n. denotes the set of correlated items between u and n.

$$userSim(u,n) = \frac{\sum_{i \subset CRu,n} (rui - \bar{ru})(rni - \bar{rn})}{\sqrt{\sum_{i \subset CRu,n} (rui - \bar{ru})^2} \sqrt{\sum_{i \subset CRu,n} (rni - \bar{rn})^2}}$$

75. The Pearson correlation and contemporaneous systems to the '282 patent failed to incorporate agreement about content in the population as a whole. For instance, the system failed to account for the fact that two users' agreement about a universally loved movie was less important than agreement on a controversial or unpopular movie. The Pearson correlation failed to capture distinctions relating to an item's general popularity. Thus, GroupLens made predictions based on data that showed similarities (arising from a piece of content being generally popular) but GroupLens' recommendations were not statistically significant.

76. John Hey's patents (U.S. Pat. Nos. 4,996,642 and 4,870,579), which are cited on the face of the '282 patent, describe a system for recommending items based on ratings of the items. Like GroupLens and other systems contemporaneous to the '282 patent, Hey's system for recommending products based on user ratings failed to account for statistically significant similarities between certain users; the recommendations were merely the product of an item or piece of content being generally popular. This prevented the Hey system from offering accurate predictions and recommendations of items and content.

77. Similarly, the Ringo music recommendation system, discussed by Upendra Shardanand and Pattie Maes, and cited on the face of the '282 patent, used Pearson's correlation measure to provide content and product recommendations. Like other systems contemporaneous to the '282 patent, Shardanand and Maes's system failed to take into account the statistically

significant similarities between certain users.[47] Information showing unusual similarity in preferences for particular users was unutilized. Furthermore, these prior art systems did not provide recommendations with statistically meaningful confidence levels as the number of items that both the user and a respective recommending user provided ratings for increased.

78. Collaborative filtering arose to solve problems faced by digital content providers in the internet era, as described by Adobe's Global Alliance Manager, Jamie Brighton:

> The catalyst for the evolution of personalization has been competition through, a product of the Internet's explosive growth. This growth provided consumers with so many options for e-commerce that it created a market in desperate need of a process by which consumers could develop a personal connection with a brand or digital storefront in a sea of rapidly evolving competitors.[48]

79. At the time the inventions disclosed in the '282 patent were conceived, the internet and the state of technology generally was vastly different from 2015, or even the state of the internet 10 years ago. For example, Facebook.com, YouTube.com, Wikipedia.com, and LinkedIn.com were years from being launched.[49]

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[47] Upendra Shardanand & Pattie Maes, *Social Information Filtering: Algorithms for Automating Word of Mouth*, in PROCEEDINGS OF CHI '95 CONFERENCE ON HUMAN FACTORS IN COMPUTING SYSTEMS 210—17 (1995).

[48] Jamie Brighton, *Changes in Personalization and What's Coming Next*, ADOBE DIGITAL MARKETING BLOG, October 21, 2014, http://blogs.adobe.com/digitalmarketing/personalization/personalization-past-present-future/.

[49] Rob Waugh, *Before They Ruled the Internet: 'Ancient' Home Pages for Amazon, Google and 'The Facebook' Show Much Web Giants Have Changed*, DAILY MAIL, January 19, 2012, http://www.dailymail.co.uk/sciencetech/article-2088445; TONY SEBA, WINNERS TAKE ALL – THE 9 FUNDAMENTAL RULES OF HIGH TECH STRATEGY 137 (2006); GEORGE A BARNETT, ENCYCLOPEDIA OF SOCIAL NETWORKS 947 (2011).

The above images show major internet properties contemporaneous (and later) to the inventions conceived in the '282 patent, including: Google.com (September 1998), Yahoo.com (March 1995), Amazon.com (1995), Myspace.com (August 2003).[50]

80. Academics such as Daniela M. Witten of the University of Washington describe the development of collaborative filtering systems as directed to solving problems arising out of so called Big Data (a term for modern networked computers that capture considerable volumes of data).

> Collaborative filtering is one example of a statistical method that has been newly-developed in the context of Big Data, in order to answer a question that didn't arise with Small Data. Collaborative filtering systems are used by companies like Amazon to suggest to a customer items that he or she might

[50] *Id.*

> want to purchase, based on his or her past purchase history as well as purchases made by other customers.[51]

81. Collaborative filtering systems, such as the system taught in the '282 patent were directed to solving a problem unique to the internet using uniquely computer based technologies.

> Computers and the web allow us to advance beyond simple word-of-mouth. Instead of limiting ourselves to tens or hundreds of individuals the Internet allows us to consider the opinions of thousands. The speed of computers allows us to process these opinions in real time and determine not only what a much larger community thinks of an item, but also develop a truly personalized view of that item using the opinions most appropriate for a given user or group of users.

J. Ben Schafer, Dan Frankowski, Jon Herlocker & Shilad Sen, *Collaborative Filtering Recommender Systems*, in THE ADAPTIVE WEB: METHODS AND STRATEGIES OF WEB PERSONALIZATION 292 (Peter Brusilovsky *et al*. eds., 2007).

82. On information and belief, contemporaneous to, and following Mr. Robinson's conception of the inventions disclosed in the '282 patent, academics, and businesses headquartered in Texas actively entered the field of collaborative filtering. Computer researchers at the University of Texas at Austin founded the Intelligent Data Exploration and Analysis Laboratory and the Machine Learning Research Group. The University of Texas at Dallas founded the Institute of Data Analytics, a center for research on data analysis, which collaborates with private industry. Baylor University in Waco, Texas is the home of the Electronic Commerce Center, which focuses on integrating technology and electronic data with e-commerce.

83. Texas based companies incorporated collaborative filtering technologies into numerous products and many of these same companies cited the '282 patent in their own patents. Texas based businesses that developed products incorporating collaborative filtering included: VideosDotCom, Inc. of McKinney, Texas; i2 Technologies US, Inc. of Dallas, Texas; Vignette Corporation of Austin, Texas; Texas Shopper Network, Inc. of Houston, Texas; Arrowsmith Technologies, Inc. of Austin, Texas; and HP Enterprise Services, LLC of Plano, Texas.

[51] Nicholas Bashour, *The Big Data Blog, Part II: Daniela Witten*, AAAS NEWS, March 17, 2014, http://www.aaas.org/news/big-data-blog-part-ii-daniela-witten.

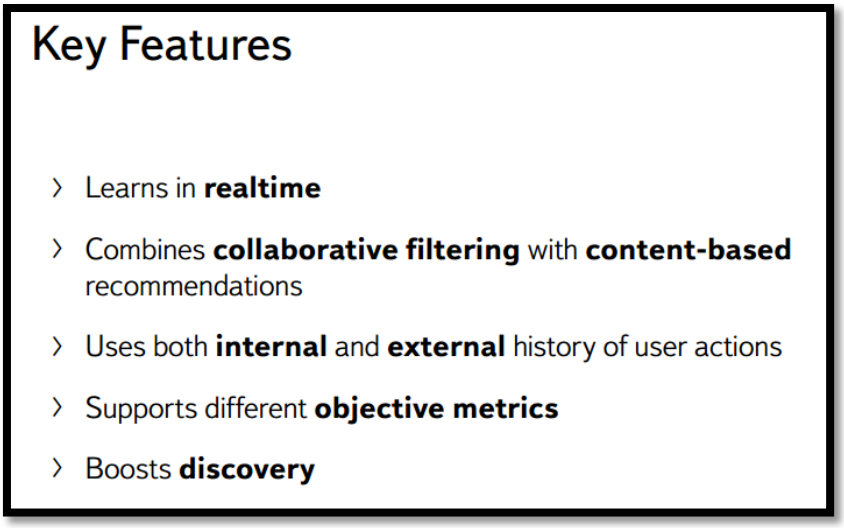
84. The '282 patent is cited by at least 60 patents that were either initially assigned to or are currently assigned to entities headquartered in Texas. Companies citing the '282 patent in their patents include i2 Technologies, Vignette Corporation, AT&T, Hewlett-Packard Development Company, and Blockbuster LLC.

THE VALUE OF MR. ROBINSON'S INVENTION

85. Executives at leading technology companies have described the value of accurate product and content recommendations as critical, lasting, and prominent. Jamie Brighton, Global Alliance Manager at Adobe, stated accurate recommendation techniques were "a light switch for innovators and marketers alike, as well as a warning. A warning that personalization was rapidly becoming the ultimate avenue for creating lasting partnerships with a digital consumer base, and that ignoring this technology simply wouldn't be an option forever."[52]

86. Presentations from Yandex software engineers state "we use collaborative filtering when we process all users affections to infer their common interests together with content based recommendations when they rely on item properties and we combine those approaches in several ways."[53]

[52] Jamie Brighton, *Changes in Personalization and What's Coming Next*, ADOBE DIGITAL MARKETING BLOG, October 21, 2014, http://blogs.adobe.com/digitalmarketing/personalization/personalization-past-present-future/.
[53] Michael Roizner, *Yandex Recommender System*, YANDEX SCHOOL OF DATA ANALYSIS PRESENTATION (October 23, 2015), available at: https://www.youtube.com/watch?v=VgioTyMyJus.



Id.

87. An IBM developerWorks® paper described the importance of providing accurate recommendations.

> Recommendation systems changed the way inanimate websites communicate with their users. Rather than providing a static experience in which users search for and potentially buy products, recommender systems increase interaction to provide a richer experience. Recommender systems identify recommendations autonomously for individual users based on past purchases and searches, and on other users' behavior.[54]

88. Numerous companies have confirmed the value of providing accurate product recommendations. "By showing the visitor the content they are looking for, you increase conversion rates and reduce bounce rates."[55] Companies such as HP, RichRelevance, and Adobe confirm the importance of collaborative filtering technologies to generating accurate recommendations.

> With these concerns in mind, RichRelevance based the enRICH platform on multiple recommendation strategies, ranging from simple categorical top sellers, to collaborative filtering algorithms . . . . After deploying the enRICH

[54] M. Tim Jones, *IBM Developer Works: Recommender Systems, Part 1: Introduction to Approaches and Algorithms* 2 (December 12, 2013), *available at* http://www.ibm.com/developerworks/library/os-recommender1/.
[55] *Cognitor: Content Guidance and Recommendations* 2, COGNITOR WEBSITE, April 15, 2015, http://www.cognitor.com/brochures/enterprise.pdf.

> platform, retail customers report improvements across a range of KPIs, including increased conversion, revenue, and repeat visits.[56]
>
> In its simplest form, collaborative filtering really works when data from multiple sources comes together and is sorted into categories. ***It is a must these days*** for any e-commerce site striving to deliver a basic level of website personalization.[57]
>
> Personalized services are becoming increasingly indispensable on the Web, ranging from providing search results to product recommendation. Examples of such systems include recommending products at Amazon.com, DVDs at Netflix, News by Google etc. The central technique used in these systems is collaborative filtering (CF) which aims at predicting the preference of items for a particular user based on the items previously rated by all users.[58]
>
> The truth is indisputable—optimization increases conversion, so every digital property needs optimization. This singular truth is transforming the practice of marketing. Now, marketers must tap into the constant stream of web activity and customer data to gain insight into what visitors and customers want to see and experience. ***They must immediately act on that insight and deliver highly relevant, personalized content*** throughout the customer life cycle.[59]
>
> Dynamic, relevant content is proven to increase engagement and conversions by as much as 6 times when compared to static content.[60]

U.S. PATENT NO. 5,885,282

89. Fellowship Filtering is the owner by assignment of the ‘282 patent. The’282 patent is entitled "Automated Collaborative Filtering System." The ‘282 patent issued on March 16, 1999, based on a patent application filed on April 9, 1998, and claims priority to a provisional

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[56] *Rich Relevance, Speak <geek> [sic] Technical Brief* 6 (2009), *available at* http://www.richrelevance.com/wp-content/uploads/2011/01/Speak-Geek2_EnsembleLearning_RichRelevance.pdf.

[57] Dan Darnell, *Collaborative Filtering and Its Importance to Personalized Recommendations in eCommerce*, BAYNOTE BLOG, April 18, 2013, http://www.baynote.com/2013/04/how-collaborative-filtering-impacts-product-recommendations/ (emphasis added).

[58] Rong Pang et al., *One-Class Collaborative Filtering*, in IEEE INTERNATIONAL CONFERENCE ON DATA MINING (ICDM 2008) 502—11 (2008) (Mr. Pang at the time was employed by Hewlett-Packard.).

[59] *Adobe Target Premium Overview* 1 (2014), *available at* http://www.adobe.com/content/dam/Adobe/en/solutions/testing-targeting/pdfs/target-premium-overview-ue.pdf (emphasis added).

[60] *BaynoteOne Product Recommendations* 1 (204), *available at* http://www.baynote.com/wp-content/uploads/2012/04/BaynoteONE-Solution-Brief-Personalized-Product-Recommendations.pdf.

application filed on April 30, 1996. A true and correct copy of the '282 patent is attached hereto as Exhibit A.

90. The claims in the '282 patent are directed at a unique computing solution that addresses a problem particular to computer networks – the recommendation of items or content based on prior user actions.

91. Recommending content over a computer network presented new and extraordinary issues over the techniques and systems known in the art at the time. Prior art recommendation systems had a number of drawbacks. Such systems "fail to take into account the probability that a random user will provide a given rating. Thus, information showing unusual similarity in preferences for particular users is not utilized." '282 patent, cols. 1:67-2:4.

92. The recommendation technologies claimed in the '282 patent were aimed at solving problems specific to the internet. "The catalyst for the evolution of personalization has been competition though, a product of the Internet's explosive growth. This growth provided consumers with so many options for e-commerce that it created a market in desperate need of a process by which consumers could develop a personal connection with a brand or digital storefront in a sea of rapidly evolving competitors." [61]

93. The technology of "[c]ollaborative filtering is a relatively young algorithmic approach" and thus was not a conventional business practice.[62]

94. One or more claims in the '282 patent recite a "similarity calculation." This element of the '282 patent is one of the "inventive concepts" of the '282 patent. The use of a similarity calculation is an "inventive concept" allowing computer servers configured to operate websites to more efficiently and accurately recommend content and products to website users.

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[61] Jamie Brighton, *Changes in Personalization and What's Coming Next,* ADOBE DIGITAL MARKETING BLOG, October 21, 2014, http://blogs.adobe.com/digitalmarketing/personalization/personalization-past-present-future/.

[62] Yehuda Koren, *Tutorial on Recent Progress in Collaborative Filtering,* in PROCEEDINGS OF THE 2008 ACM CONFERENCE ON RECOMMENDER SYSTEMS (RECSYS '08) 333-334 (2008).

95. The ‘282 patent does not preempt every way of “providing recommendations using a computer system,” as systems for doing so existed before this invention, and systems exist now that allow website operators to provide recommendations without infringing the claims of the ‘282 patent.

96. The ‘282 patent claims do not preempt the field or preclude the use of other effective recommendation technologies. The ‘282 patent claims include inventive elements such as the use of probability calculations, randomized transformed ratings data, and/or similarity values to generate preference data over a computer network. The elements in the ‘282 claims greatly limit the breadth of the ‘282 patent's claims. These limitations are not necessary or obvious tools for achieving the generation of user preference data and/or recommendations, and they ensure that the claims do not preempt the field of recommendation systems and/or collaborative filtering.

97. Other techniques for collaborative filtering that are not included within the scope of the ‘282 patent's claims include, but are not limited to, the prior art discussed in the ‘282 patent:

- U.S. Patent No. 4,870,579 to Hey teaches providing recommendations to a user based on a user selected from a group of users, the reactions of the selected user to items sampled by one or more users in the group but not sampled by the selected user.
- U.S. Patent No. 4,996,642 to Hey teaches providing recommendations to a user based on other items previously sampled by that user and on the availability of the item. Further, the recommendations were represented by a scalar rating for each item.
- U.S. Patent No. 5,452,410 to Magidson teaches apparatus and methods for achieving statistical analysis of categorical and continuous outcomes and for displaying the results of such analyses.
- Upendra Shardanand, "Social Information Filtering for Music Recommendation" Sep. 1994, pp. 1-93, Massachusetts Institute of Technology, Thesis. This system attempted to provide recommendations to a user based on ratings for items provided by the user as compared with other users.

98. The ‘282 patent claims do not preempt the field of recommendation systems. Technologies falling outside the scope of the ‘282 patent may include, but are not limited to, the

following: (1) filtering relying solely on content-based techniques, (2) collaborative filtering using only a standard *Pearson r* correlation coefficient, (3) collaborative filtering relying on the Mean Squared Difference, and (4) community-based recommendation systems.

99. In contrast to the '282 patent, the patents at issue in *I/P Engine Inc. v. AOL Inc.*, claimed all instances of recommendation systems where content and collaborative filtering was used. Judge Mayer, in his Federal Circuit concurring opinion wrote, "the scope of the claimed invention is staggering, potentially covering a significant portion of all online advertising." *I/P Engine, Inc. v. AOL Inc.,* 576 F. App'x 982, 995 (Fed. Cir. 2014). Further, despite the asserted patents (U.S. Patent Nos. 6,314,420 and 6,775,664 ("I/P Engine Patents")) claiming a priority date of 1998 (*Id*. at 997) and a specification 50% shorter than that of the '282 patent, the I/P Engine Patents' broad claims were upheld by the Patent and Trademark Office in two reexamination proceedings, by a jury following a 12 day trial, and by United States District Judge Raymond Alvin Jackson following significant post-trial briefing. In contrast, the provisional application to which the '282 patent claims priority precedes the I/P Engine Patents' priority date by two years and contains significantly narrower claims.

100. The '282 claims are not directed to any "method of organizing human activity," "fundamental economic practice long prevalent in our system of commerce," nor "a building block of the modern economy." Instead, the '282 patent's claims are limited to the realm of systems utilized in "calculating similarity values" and "recommending products and content" over a "computer network."

101. The '282 patent's claims are not directed at the broad concept or idea of "recommending items." Instead, the claims are directed to particular, narrow methods and systems for "providing recommendations by transforming user data," using technologies unique to the internet age. The inventive concept in the '282 claims is a technological one rather than an entrepreneurial one – the development of systems and methods used to calculate content and/or product recommendations that are statistically significant, thus improving the accuracy of the content and/or product recommendations.

102. The ‘282 patent does not take a well-known or established business method or process and “apply it to a general purpose computer.” Instead, the specific system and processes described in the ‘282 patent have no direct corollary to a business process that predates the advent of the internet.

103. The ’282 patent’s claims are directed toward a solution rooted in computer technology and uses technology unique to computers and networks to overcome a problem specifically arising in the realm of making product and content recommendations over a computer network. For example, the ‘282 patent’s claims are directed toward generating recommendations using data collected in a database from users over the internet — a result that overrides the routine and conventional sequence for providing recommendations known in the art at the time the inventions disclosed in the ‘282 patent were conceived.

104. The ‘282 patent’s claims are not directed at a mere mathematical relationship or formula as the ‘282 patent's claims teach specific systems and methods for providing recommendations of content and products over a computer network using both data from prior users of a website as well as information created by the systems and methods described in the ‘282 patent’s claims.

105. The ‘282 patent’s claims cannot be performed by a human, in mind, or by pen and paper. The claims as a whole are directed to generating user preference data using a connection to the internet to gather data from users, a database to store user data, and a computer processor to conduct complex statistical calculations. These limitations establish that the ‘282 patent’s claims are not an abstract idea, because they cannot be performed by a human, in the human mind, or by pen and paper.

106. Further, the ‘282 patent disclosure requires a computer to generate content and/or product recommendations. For example, in block 90, the method disclosed in the ‘282 patent computes whether the similarity value is sufficient to generate preference data. The result of the steps described in the ‘282 patent is a computer server using processing power to conduct complex

calculations over large data sets and creating new data used by the system to improve the quality of recommendations.

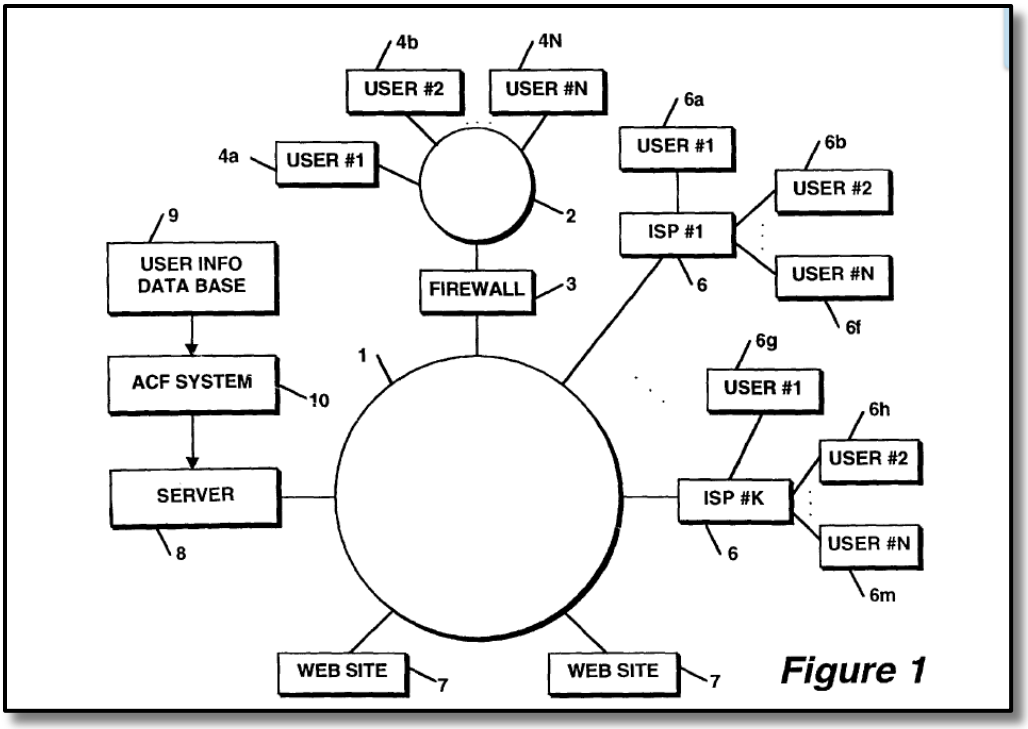

Fig. 4 (showing the implementation of the '282 patent system arose from receiving user data over the internet including through a website).[63]

107. The use of probability calculations to generate user preference data is not a conventional, routine activity in which humans engage.

108. The prior art cited on the face of the '282 patent further shows the invention claimed in the '282 patent is not a patent ineligible abstract idea. The invention described in the '282 patent's claims is narrower than much of the cited prior art, and therefore, is not an abstract idea. For example, U.S. Pat. Nos. 4,996,642 to Hey describes systems and methods that attempted to provide recommendations to a user based on ratings for items provided by the user as compared with other users. The '282 patent's claims require additional limitations and thus the '282 patent's claims are directed toward significantly more than an abstract idea and the '282 patent's claims do not preempt the field of recommendation engines or even collaborative filtering.

[63] '282 patent, fig. 1.

109. The claimed invention in the '282 patent's claims is rooted in computer technology and overcame a problem specifically arising in the realm of computer networks. The '282 patent's claims require the use of a computer system.

110. The use of a computer system plays a significant part in performing the claims of the '282 patent. For example, the use of a computer processor to generate user preference data utilizing data stored in a computer database is integral to the success of the system, and can only be performed using a computer system. The use of a computer system to process user data stored in a database does far more than improve the efficiency of the process; the computer system is integral to accomplishing the generating of recommendation data.

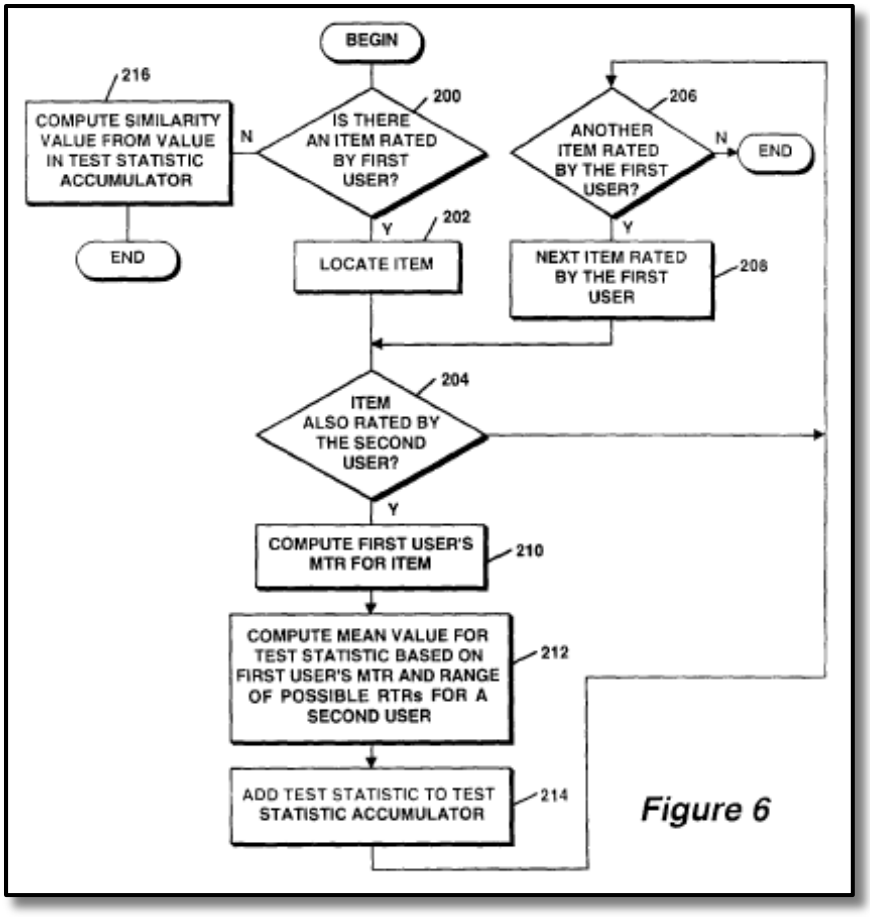

Fig. 5 (showing the generation of recommendation data).[64]

[64] '282 patent, fig. 6.

111. The rising volume of content and data made possible by the internet drives the need to identify relevant products and content using filtering technologies such as that disclosed in the '282 patent.

> With the development and popularity of WWW, billions of web pages are retrievable via search engines like Google. Despite it is not a perfect method to find what we want, most search engines still use keywords in documents and queries to calculate the relevance. As the only interface for users accessing tremendous web pages, queries are one of the most important factors that affects the performance of search engines. However, web pages returned from search engines are not always relevant to user search intentions. An independent survey of 40,000 web users found that after a failed search, 76% of them will try to rephrase their queries on the same search engine instead of resorting to a different one.[65]

112. Dan Darnell, a Senior Director of Product Marketing at Baynote, similarly described collaborative filtering as directed to solving problems specific to the internet:

> In its simplest form, collaborative filtering really works when data from multiple sources comes together and is sorted into categories. It is a must these days for any e-commerce site striving to deliver a basic level of website personalization.[66]

113. Academics have recognized that the development of collaborative filtering recommendation systems is directly tied to and an outgrowth of information overload problems created by and unique to the internet.

> The challenge of finding the needed information from the web has led to the development of a number of recommender systems, which typically watch the user navigation behavior as a sequence of pages and suggest another set of web pages, products and other information besides the actual information. With the exponential growth of the web, the study of modeling and predicting a user's access on the web has become crucial to the researchers and portal developers.[67]

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[65] Zhiyuan Liu & Maosong Sun, *Asymmetrical Query Recommendation Method Based on Bipartite Network Resource Allocation*, in PROC. OF WWW'08 1049 (2008).

[66] Dan Darnell, *Collaborative Filtering and Its Importance to Personalized Recommendations in eCommerce*, INTELLIGENCE COLLECTED: THE BAYNOTE BLOG, April 18, 2013, http://www.baynote.com/2013/04/how-collaborative-filtering-impacts-product-recommendations/ (Dan Darnell is a Senior Director of product marketing at Baynote).

[67] Gopinath Ganapathy & P.K. Arunesh, *Feature Analysis of Recommender Techniques Employed in the Recommendation Engines*, J. COMPUT. SCI. 6(7): 748—55 (2010).

> To overcome this so called "information overload" problem, in the mid-1990s researchers started to investigate recommender systems. A recommender system (RS) uses knowledge about your preferences (and those of others) to recommend items you are likely to enjoy. Users can offer feedback on items they are familiar with for example, and the recommender system uses the information to predict their preference for yet unseen items and subsequently recommends items with the highest predicted relevance.[68]

114. A 2009 paper supported by the Samsung Research Fund, ties collaborative filtering technologies to solving problems unique to the internet – the generation of information using a common communications infrastructure.

> The amount of information on the Web is increasing according to the growth of information and communication infrastructure. As a result, recommender systems (RSs) for personalization are required. An RS provides content or items considering the tastes of individual users. Among the various RSs, collaborative filtering (CF) is the process of filtering for information or patterns using collaborative techniques involving multiple users.[69]

115. Years after the Ringo system was developed (the Ringo system is referenced on the face of the '282 patent), the use of collaborative filtering techniques was described as "innovative" by data scientists.

> Ringo also provides an innovative solution that inverts the basic CF approach; music albums are treated as 'participants' that can recommend users to other music album participants.[70]

116. One or more of the '282 patent's claims relate to a computer-implemented method to transform website user data in a particular manner – by inserting information into user data and using the code to recommend content and/or products. This insertion enables the computer system to recommend content and/or products and generate similarity values.

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[68] Joost de Wit, *Evaluating Recommender Systems -- An Evaluation Framework to Predict User Satisfaction for Recommender Systems in an Electronic Program Guide Context* 9 (May 2008), Master's thesis, University of Twente, http://essay.utwente.nl/59711/.

[69] Hyeong-Joon Kwon et al., *Improved Memory-based Collaborative Filtering Using Entropy-based Similarity Measures*, in SYMPOSIA AND WORKSHOPS ON UBIQUITOUS, AUTOMATIC AND TRUSTED COMPUTING (WISA'09) (May 2009) (this work was supported by Samsung).

[70] Sonny Han Seng Chee et al., *Rectree: An Efficient Collaborative Filtering Method*, in 3RD INT. CONF. ON DATA WAREHOUSING AND KNOWLEDGE DISCOVERY (DAWAK 2001) 141 (2001).

117. One or more of the claims in '282 patent go beyond manipulating, reorganizing, or collecting data by actually adding information associated with a user and using that information to generate a recommendation of a product or content over a computer network, thereby fundamentally altering ratings data associated with a user.

118. One or more of the claims in the '282 patent require 'transforming' data to generate "randomized ratings data" by "adding a uniformly distributed random number to the ratings data provided by the plurality of users." Therefore, the claims in the '282 patent alter data associated with a user and go beyond the mere collection, organization, manipulation, or reorganization of data. The claimed invention goes beyond manipulating, reorganizing, or collecting data by actually adding a new subset of numbers or characters to the data, thereby fundamentally altering the original information.

119. One or more of the claims in the '282 patent requires 'transforming' one thing ('ratings data') 'to create' something else ('randomized ratings data') and further recites a particular manner of transforming ('by adding a uniformly distributed random number to the ratings data provided by the plurality of users'). Therefore, claimed features in the '282 patent "fundamentally alter" data or "transform" the data.

120. Nor does collaborative filtering merely "support an existing activity." Professor Loren G. Terveen of the University of Minnesota[71] and Will Hill of AT&T Labs described collaborative filtering as improving the functioning of computer-based recommendation systems by updating a computer database and transforming data.

> Collaborative filtering does not simply support an existing activity. Instead, it requires users to engage in a somewhat novel computationally mediated activity. This activity has a single combined role, the recommendation seeker / preference provider. We describe this as *role uniformity*. Everyone does the same work (rates items) and receives the same benefits (gets rated items as recommendations). We might describe rating items as an "ante" – to get recommendations, you have to give them. ***This leads naturally to growth in***

[71] Loren Terveen was a principal member of the technical staff at AT&T Labs.

> ***the system's knowledge (and thus to better recommendations), since using the database leads to the database being updated***.[72]

121. White papers from various corporations describe computer-implemented recommendation systems as transforming the data of a previously static website – generating preference information that previously did not exist. Recommendation systems like the inventions disclosed in the '282 patent utilize a system for modifying data that has a concrete effect in the field of website and internet usage.

> Rather than providing a static experience in which users search for and potentially buy products, recommender systems increase interaction to provide a richer experience. Recommender systems identify recommendations autonomously for individual users based on past purchases and searches, and on other users' behavior.[73]

122. Further, the '282 patent claims improve upon the functioning of a computer system. "Performance improves as the number of entries in the database increases." '282 patent, col. 23:29-30. The claims and specification of the '282 patent also describe the use of "cluster analysis," which improves the functioning of a computer handling the making of recommendations. "As a means for more efficient processing, cluster analysis can be used." *Id*. 20:36-37.

123. One or more of the claims of the '282 patent recite a means or step for performing a specified function. The corresponding structure(s) in the '282 patent specification and appendix include computer code that improves the functioning of a computer by being more "RAM-efficient." '282 patent, cols. 33:1-39:60.

124. Academic research has confirmed that using ratings improves the functioning of a computer conducting collaborative filtering.

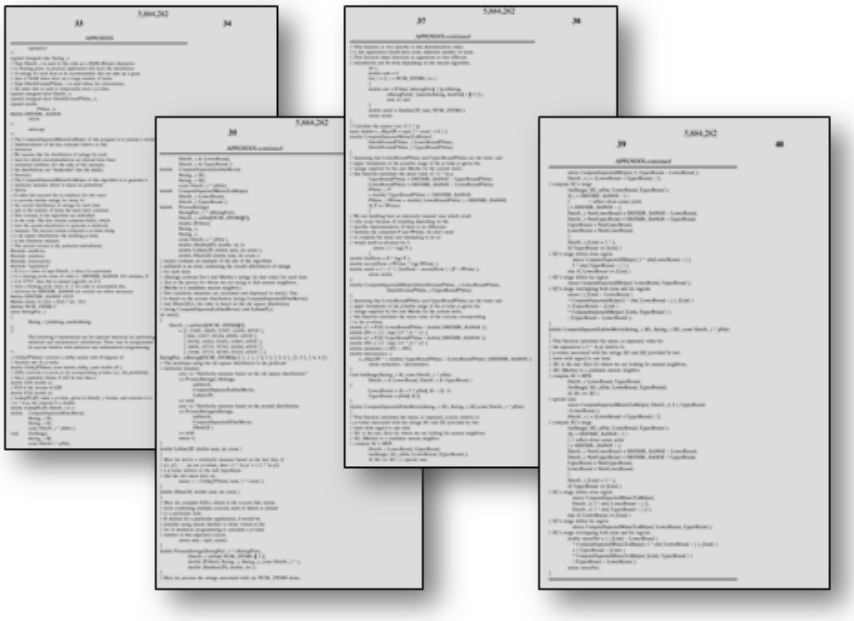
> One way to make recommendations of regular, but interesting items, more likely consists in assigning weights to items that devalue ratings given to

[72] Loren Terveen & Will Hill, *Beyond Recommender Systems: Helping People Help Each Other*, in HCI IN THE NEW MILLENNIUM 13 (Jack Carroll, ed., Addison-Wesley, 2001) (emphasis added).
[73] M. Tim Jones, *IBM Developer Works: Recommender Systems, Part 1: Introduction to Approaches and Algorithms* 2 (December 12, 2013), *available at* http://www.ibm.com/developerworks/library/os-recommender1/.

> popular items and appreciate ratings given to regular items. . . . The results of the first set of experiments are shown in Fig. 5. The precision@n values show that when using the weighting functions, the resulting precision@n is slightly higher for low values of n than for the unweighted approach for the Moviepilot dataset (n=5). For the Movielens dataset, the unweighted approach seems to have the upper hand. However, as n increases, the improvement decreases and at a relatively large n (n=50) the weighted approaches perform worse than the non weighted one. In the Movielens case, the unweighted approach always outperforms the weighted ones, irrelevant of n's value. This seems to be in agreement with the findings by Herlocker et al. Results for the Euclidean and cosine measures showed very similar trends and have thus been omitted.[74]

125. One or more of the claims in the '282 patent recite means-plus-function claim limitations governed by 35 U.S.C. § 112, ¶ 6.

126. The '282 patent discloses computer algorithms in an appendix to the specification. In addition to the structures and algorithms disclosed throughout the specification, these algorithms correspond to means-plus-function claims in the '282 patent.



'282 patent, cols. 39-40 (computer algorithms disclosed in an appendix to the specification).

[74] Alan Said et al., *Analyzing Weighting Schemes in Collaborative Filtering: Cold Start, Post Cold Start and Power Users*, in PROCEEDINGS OF THE 27TH ANNUAL ACM SYMPOSIUM ON APPLIED COMPUTING (SAC'12) 2035, 2039 (2012).

127. Means-plus-function claims such as those included in the '282 patent are inherently not abstract ideas. Stanford Law Professor Mark Lemley described his analysis:

> If the patent is interpreted as a means-plus-function claim, it will be limited to the particular software implementation the patentee actually built or described. Such a narrow, specific claim should not be an unpatentable "abstract idea."[75]

> But if you wrote it [an algorithm] and you included it in the step I think you could survive the *Aristocrat* line of cases and then the question will become well what does equivalent thereof mean? Can I show you my algorithm and say, yeah, this is the approach I took but these other four approaches are equivalent and a computer programmer would look at those and say I don't care which one of those you use. ***And if you can do that then you might end up with a claim that's still pretty broad even though it's in means plus function format***.[76]

COUNT I
INFRINGEMENT OF U.S. PATENT NO. 5,885,282

128. Fellowship Filtering references and incorporates by reference the preceding paragraphs of this Complaint.

129. Yandex makes, uses, sells, and/or offers for sale in the United States products and/or services for generating product and/or content recommendations (e.g., webpage search results).

130. On information and belief, Yandex recommendation products and/or services provide or support generating product and/or content recommendations based on enhanced collaborative filtering technologies to drive more successful and relevant recommendations.

131. On information and belief, Yandex operates the internet site: www.yandex.com.

132. On information and belief, Yandex operates the internet site: www.yandex.ru.

133. On information and belief, Yandex operates the internet site: market.yandex.ru.

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[75] Mark A. Lemley, *Software Patents and the Return of Functional Claiming*, 2013 WISC. L. REV. 905 (2013).

[76] Eugene Quinn, *The Ramifications of Alice: A Conversation with Mark Lemley*, IPWATCHDOG BLOG, September 4, 2014, http://www.ipwatchdog.com/2014/09/04/the-ramifications-of-alice-a-conversation-with-mark-lemley/id=51023/ (emphasis added).

134. On information and belief, the Yandex Support Center provides product guides and manuals relating to Yandex's recommendation products.

135. On information and belief, the Yandex Support Center can be accessed at: https://yandex.com/support/.

136. On information and belief, Yandex builds and offers to its customers (website visitors and advertisers) recommendation products and services, such as, yandex.ru, yandex.com and market.yandex.ru and all versions and variations thereof since the issuance of the '282 patent (collectively, "Yandex Products").

137. On information and belief, one or more of the Yandex Products incorporates collaborative filtering technology.

138. On information and belief, one or more of the Yandex Products enable the calculation of recommendations based on similarity, so people who bought this bought that or people who viewed this bought that, or people who viewed this viewed that are recommended relevant content or products.

139. On information and belief, Yandex Products are available to businesses and individuals throughout the United States.

140. On information and belief, Yandex Products are provided to businesses and individuals located in the Eastern District of Texas.

141. On information and belief, Yandex makes training materials available (relating to one or more of the Yandex Products) in the Eastern District of Texas.

142. On information and belief, one or more of the Yandex Products calculate recommendations based on "explicit ratings" of content and/or products.

143. On information and belief, Yandex has described its recommendation products as automatically discovering individualized behavior patterns to generate highly accurate recommendations in real time.

144. On information and belief, one or more of the Yandex Products enable the calculation of "correlation."

145. On information and belief, one or more of the Yandex Products incorporates functionality for calculating Chi-square tests, measures of association, and risk differences.

146. On information and belief, one or more of the Yandex Products include functionality for calculating similarities between users including the use of nearest neighbor search.

147. On Information and belief, one or more of the Yandex Products perform correlation matrix computation.

148. On information and belief, the recommendation engine in one or more of the Yandex Products supports retail business processes by providing recommendations.

149. On information and belief, the Yandex Products enable the calculation of "Cosine correlation."

150. On information and belief, the following figure shows recommendations on the Yandex.Market website.

YANDEX COMPANY PRESENTATION at 25 (March 2015) (showing the Yandex.market webpage identifying "similar goods recommendation tool").

151. On information and belief, the Yandex Products contain an interface for obtaining ratings data from User A and other users (the plurality of users). The data is obtained via a webpage maintained by Yandex. The interface obtains ratings data including both explicit and implicit ratings data. Explicit ratings data can include things such as "like" or "star rating."

152. On information and belief, the Yandex Products collect implicit ratings data via an interface. The implicit ratings data includes "views" and "clicks" of a webpage. The below documentation from Yandex shows that the system collects implicit and explicit ratings data.

> Our system uses logs of interactions between users and items represented as a set of events. Each event is specified with user ID, item ID, event type (e.g., click, view, like), timestamp and some context features (e.g., location, weather, current radio station, etc.). All items may have different types, content features, and connections between each other (such as track–artist).

Michael Levin (Chief Data Scientist, Yandex), *Yandex Data Factory*, YANDEX DATA SCHOOL POSTER (October 2015).

153. On information and belief, Yandex's collection of implicit data can include click information that is passed to the Yandex Recommender System through websites maintained by Yandex.

> for each query issued by the user. Yandex uses three grades of relevance:
>
> - Irrelevant, $r = 0$.
>
> A result gets a irrelevant grade if it doesn't get a click or if it receives a click with dwell time strictly less than 50 units of time.
>
> - Relevant, $r = 1$.
>
> Results with dwell times between 50 and 399 time units receive a relevant grade.
>
> - Highly relevant, $r = 2$.
>
> Is given to two types of documents – a) those that received clicks with a dwell time of 400 units or more, and b) if the document was clicked, and the click was the last action of the session (irrespective of dwell time). The last click of a session is considered to be highly relevant because a user is unlikely to have terminated her search if she is not satisfied.
>
> In cases where a document is clicked multiple times after a query, the maximum dwell time is used to calculate the document's relevance.

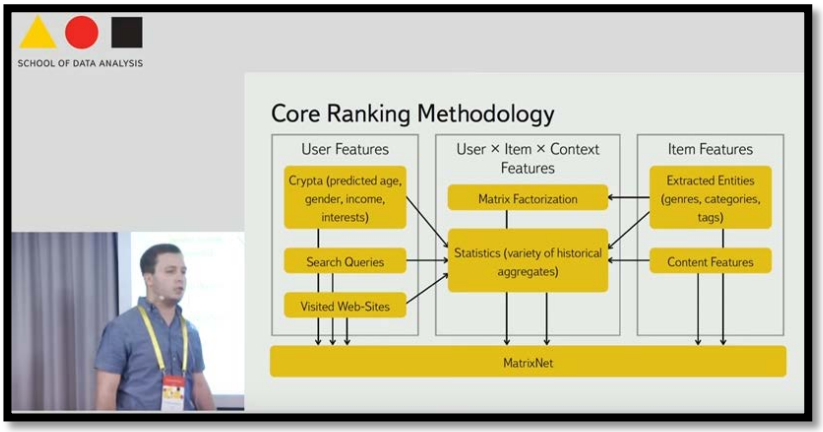
Hema Yoganarasimhan, *Search Personalization Using Machine Learning* at 11 (April 5, 2015), available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2590020 (describing the data collected by Yandex and processed by its recommendation engine to generate product and webpage recommendations).

> Yandex uses the time elapsed between a click and the next action (click or query), or dwell-time, to associate a score of 0, 1, or 2 for each click. If the dwell-time is less than a given threshold (50 units of time given by Yandex)

> or if the url has not been clicked at all the url score is 0. If dwell-time is between 50 and 300 units of time, the score is 1. Finally if the dwell-time is more than 300 or if it is the last click of the session the associated score is 2. When a URL is clicked many times the highest relevance is retained.

Paul Masurel and Kenji Lefevre-Hasagawa, *Dataiku's Solution to Yandex's Personalized Web Search Challenge*, in WSCD '14 at 2 (2014) (discussing the collection of ratings data in the form of "click" information).

154. As shown in the below diagram the Yandex Products take in ratings information (e.g., data that fees the recommendation model) and generate recommendations.



Michael Roizner, *Yandex Recommender System,* YANDEX SCHOOL OF DATA ANALYSIS PRESENTATION (October 23, 2015), available at: https://www.youtube.com/watch?v=VgioTyMyJus.

155. On information and belief, the Yandex Products create a generalized score as part of generating recommendations. This generalized score can include the overall ratings distribution.

156. On information and belief, one or more of the Yandex Products take into account the ratings distribution in recommending products, webpages, and/or content.

157. On information and belief, one or more of the Yandex Products use user-based matching to determine matches between a first and second user. When a first user inputs ratings data that ratings data is compared against the ratings data of other users.

158. On information and belief, one or more of the Yandex Products compare user ratings for a common item to recommend a new item to a user.

159. On information and belief, Yandex Products state in documentation for one or more of the Yandex Products that the recommendation engine generates average ratings.

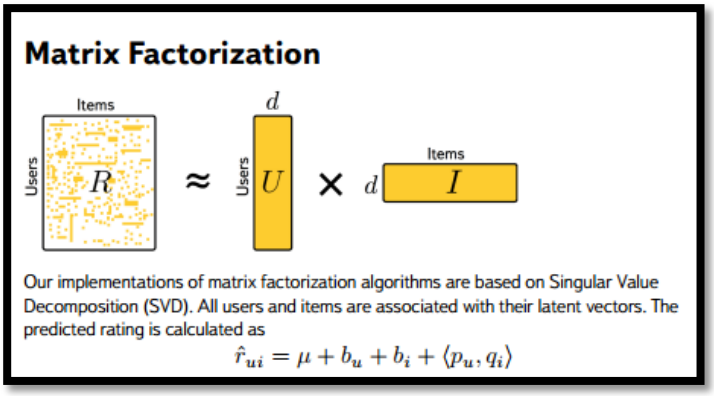
160. On information and belief, one or more of the Yandex Products enable creation of a correlation matrix.

161. On information and belief, one or more of the Yandex Products enable recommendation strategies including comparing users' "click history" against prior users of a website.

162. On information and belief, one or more of the Yandex Products includes algorithms that use averaging to improve predictive accuracy.

163. On information and belief, one or more of the Yandex Products enable the use of "k-means" to generate recommendations of products and/or content.

164. On information and belief, one or more of the Yandex Products enable the identification of recommended products, webpages, and/or content based on linking products to users' browsing and/or purchase history.



Michael Roizner, *Yandex Recommender System*, YANDEX DATA SCHOOL POSTER (October 2015) (Stating that for each item an associated latent vector is generated. The poster goes onto explain that "items vectors are updated periodically (e.g., every night).").

165. On information and belief, one or more of the Yandex Products generate recommendations by controlling for "popularity bias."

166. On information and belief, the Yandex Products enable the calculation of a similarity value based on a test statistic for a first and second user.

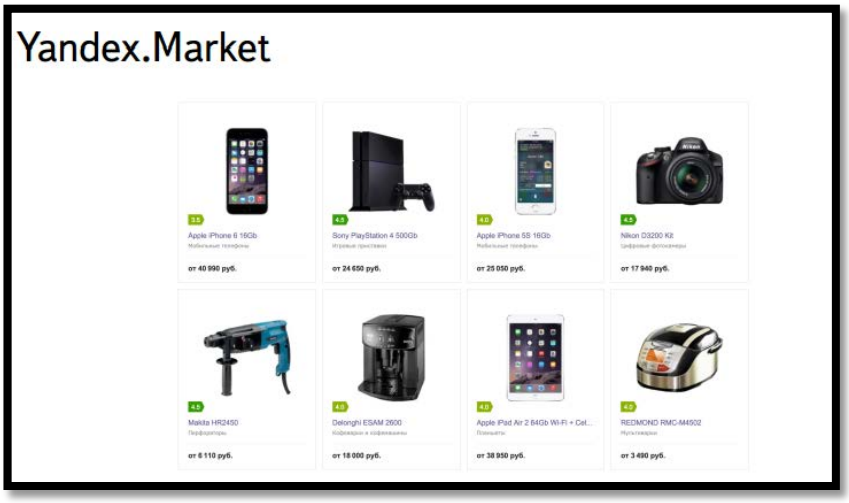
167. On information and belief, one or more of the Yandex Products enable multivariate calculations to determine a recommendation.

168. On information and belief, one or more of the Yandex Products generates similarity calculations by taking into account the total number of items the users have in common.

169. On information and belief, one or more of the Yandex Products enable K-means clustering analysis. K-means clustering identifies groups of similar data values in large segments of stored data.

170. On information and belief, the Yandex Products can generate real time predictions and recommendations using a collaborative filtering engine that analyzes user interactions and ratings.

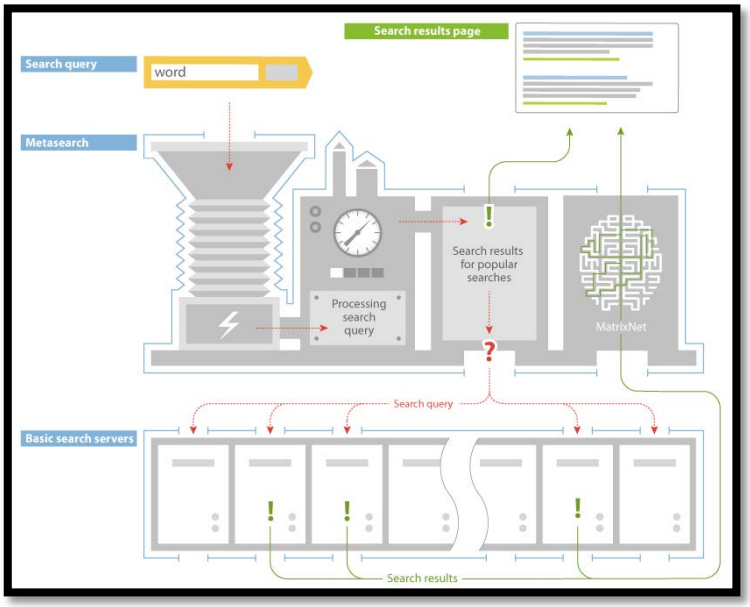
171. On information and belief, the interface of Yandex Products obtain ratings data from User A and obtains ratings data about the overall ratings distribution for the item. The below screen capture shows one of the interfaces (Yandex.Market) for receiving ratings data.



Michael Roizner, *Yandex Recommender System*, YANDEX DATA SCHOOL PRESENTATIONS at 4 (October 6, 2015).

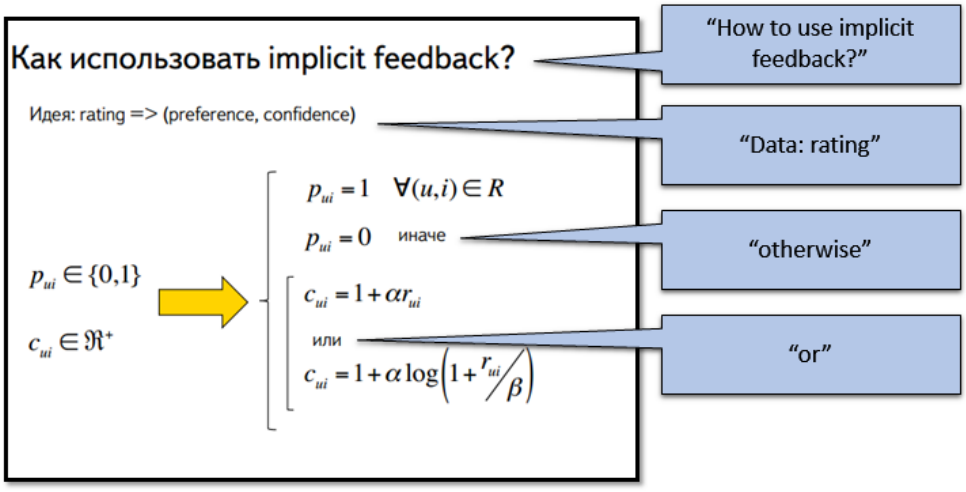
172. On information and belief, the Yandex Products include a "front-end" interface for obtaining ratings data. The below screenshot shows that the ratings data is obtained through an interface.

The Interface For Ratings Data



Yandex Products & Technologies – Search Architecture, YANDEX COMPANY WEBSITE (last visited December 5, 2015), available at: https://company.yandex.com/technologies/searcharch.xml (showing that Yandex receives ratings data from a user through mechanism such as the Yandex homepage).

173. On information and belief, the Yandex Products receive implicit and/or explicit ratings data from a user as discussed below in a slide from a presentation of a developer in Yandex's recommendation systems group.

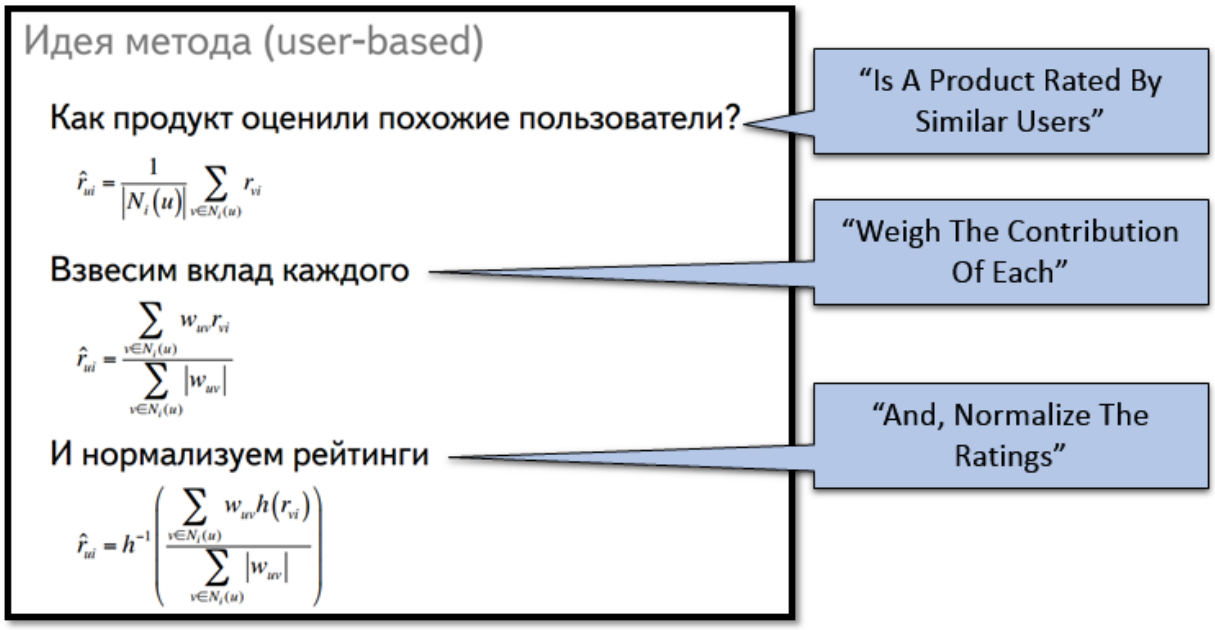


Andrey Danilchenko, Яндекс discovery products [Yandex discovery products],Рекомендательные системы [Reference System] at 30 (November 16, 2015) (Document from Yandex developer describing the use of implicit ratings which include preference

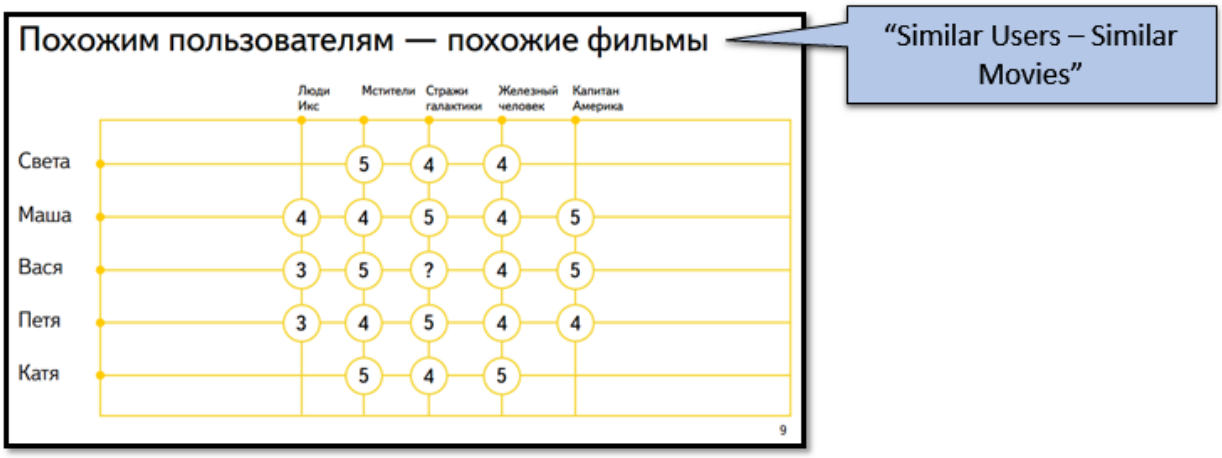
information. The blue annotations are translations of the Russian text provided by Fellowship Filtering.).

174. On information and belief, the Yandex Products comprise a recommender system that uses user-based matching to determine matches between a first and second user. When a first user inputs ratings data, that ratings data is compared against the ratings data of other users. Comparing user ratings for a common item to recommend a new item to a user is a subset of collaborative filtering called "user-based collaborative filtering."

175. On information and belief, the below excerpts from presentations by Yandex developers show the calculations used to generate recommendations in the Yandex Products.

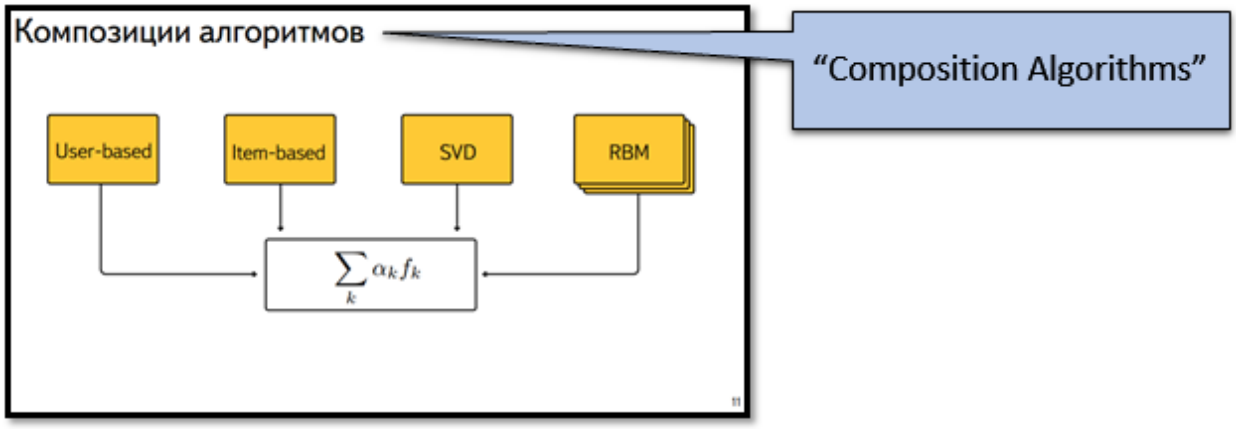


Andrey Danilchenko, разработчик, Яндекс [Yandex, Developer], Введение в рекомендательные системы [Introduction to Recommender Systems] at 13 (November 12, 2013) (Document from Yandex Developer describing the steps undertaken for generating recommendations using collaborative filtering. The blue annotations are translations of the Russian text provided by Fellowship Filtering.).



Michael Roizner, Яндекс - Руководитель группы разработки рекомендательных систем [Head of the recommendation systems software development group at Yandex], Настоящее и будущее рекомендательных систем [Present and future of Recommendation Systems], Yet another Conference 2014 Presentation at 9 (November 13, 2014) (slide from Yandex presentation showing recommendation system for movies where the X axis contains movies (e.g., X-Men, The Avengers) and the Y axis contains users (e.g., Света, Маша).

176. On information and belief, the Yandex Products comprise a recommender system that incorporates user based recommendation algorithms into its "matrix" for making recommendations.

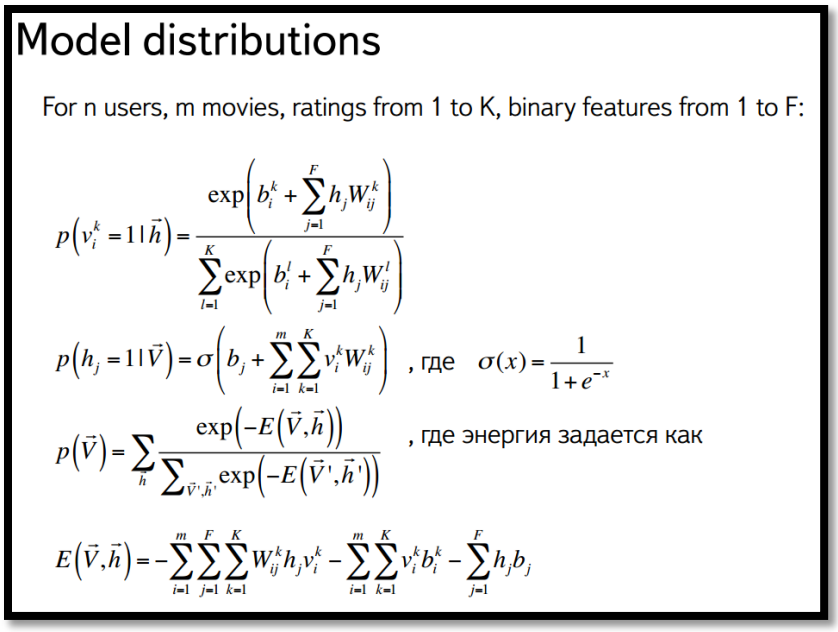


Michael Roizner, Яндекс - Руководитель группы разработки рекомендательных систем [Head of the recommendation systems software development group at Yandex], Настоящее и будущее рекомендательных систем [Present and future of Recommendation Systems], Yet another Conference 2014 Presentation at 11 (November 13, 2014) (Yandex presentation showing that "composition algorithms" include user-based collaborative filtering, item-based collaborative filtering, singular value decomposition, and Restricted Boltzman Machine algorithms.).

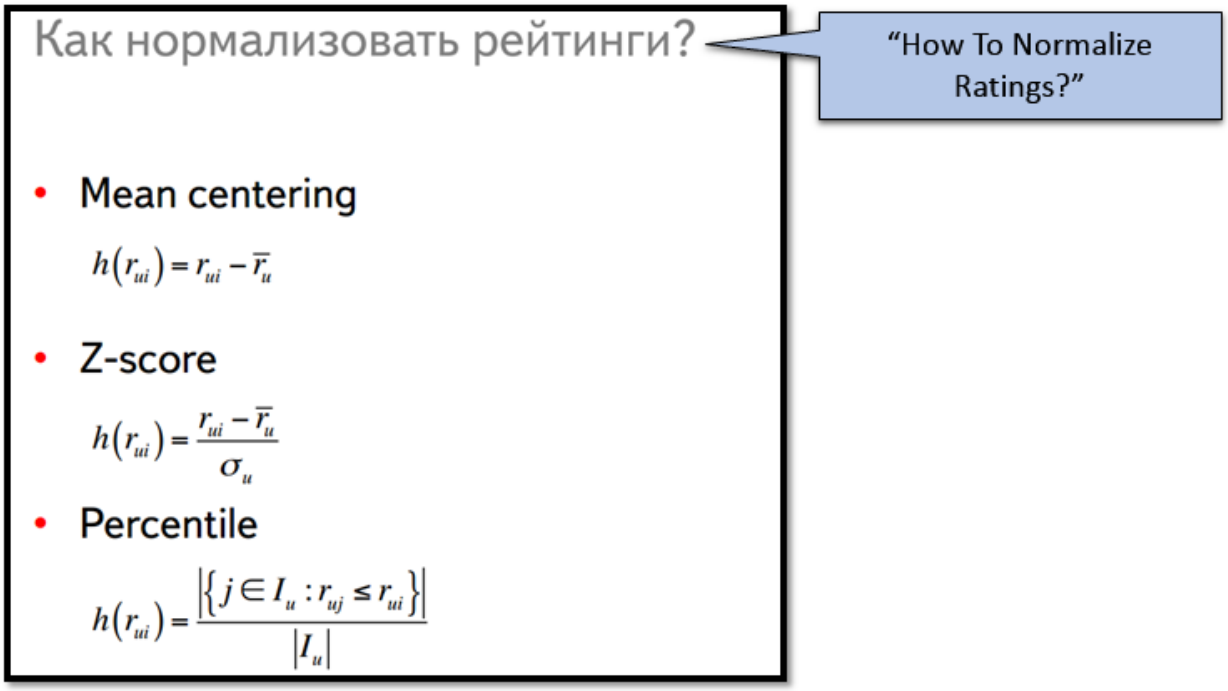
177. On information and belief, the Yandex Products comprise a recommendation system that creates first transformed ratings data from the ratings data that is provided from a first

user. The first transformed rating data is based on the ratings data for the first common item. For example, the accused system takes ratings data (e.g., a user has purchased the item, rated the item using stars, or viewed the item) and then transforms that data into transformed ratings data. The transformed ratings data can include controlling for the probability value that other users would also rate/purchase/view the item. '282 Patent 2:47-50 ("taking into consideration the probability of what rating a random user would provide"). The transformed ratings data might also reflect weighted averages, probability values of a subset of users, a model data set, a predetermined range of information, or data taken from a database. '282 Patent 7:36-39; 8:19-35.

178. On information and belief, the below excerpt from materials about the Yandex Products shows that the recommendation system takes data about the first item and transforms the data into "transformed data" which takes into account the ratings distribution of the first item or a general distribution of ratings information.

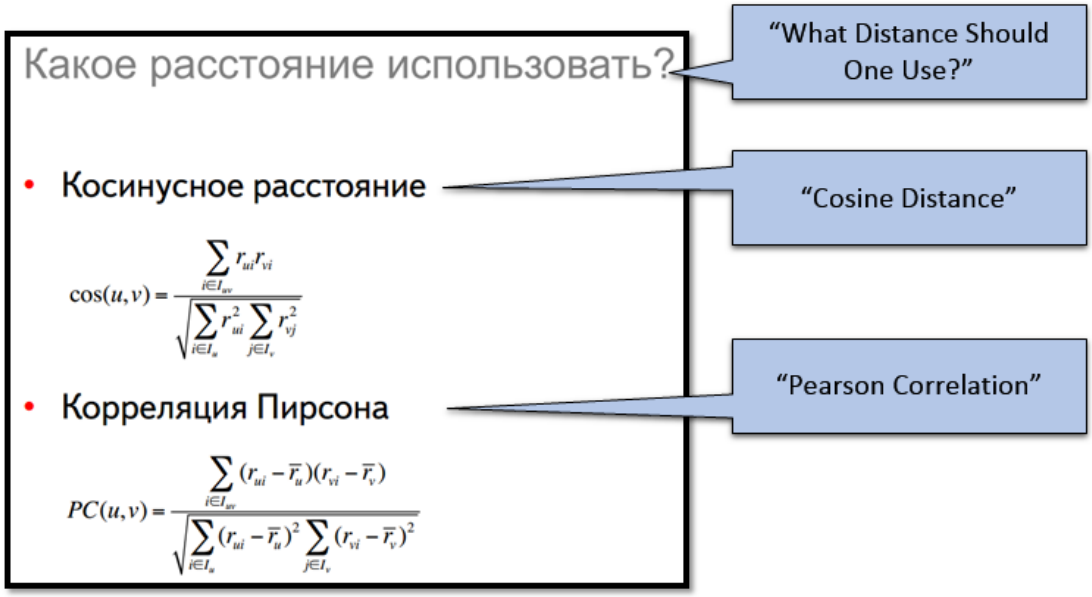


Andrey Danilchenko, группа разработки рекомендательных систем, Яндекс [Yandex, Recommendation Systems Development Group], Рекомендательные системы Лекция №4: Advanced Models [Reference System Lecture No. 4: Advanced Models] at 4 (December 6, 2014) (in this slide a member of Yandex's recommendation systems development group describes the use of weighting to model distributions of ratings data for an item/webpage across the population of users).



Andrey Danilchenko, разработчик, Яндекс [Yandex, Developer], Введение в рекомендательные системы [Introduction to Recommender Systems] at 15 (November 12, 2013) (Document from Yandex describing the steps undertaken for generating recommendations. The blue annotations are translations of the Russian text provided by Fellowship Filtering.).

179. On information and belief, the Yandex Products comprise a recommendation system that calculates and recommends items and webpages based on similarity values that take into account a "distance" measure.



Andrey Danilchenko, разработчик, Яндекс [Yandex, Developer], Введение в рекомендательные системы [Introduction to Recommender Systems] at 14 (November 12, 2013) (Document from Yandex describing the steps undertaken for generating recommendations where the matching of users can be based on cosine distance and/or the pearson correlation formulas. The blue annotations are translations of the Russian text provided by Fellowship Filtering.).

180. On information and belief, the Yandex Products comprise a recommendation system that includes a rating processor that takes the ratings data for a common item (Item A) and computes its average rating. In the Yandex Recommendation System the creation of randomized transformed ratings data is performed by data modeling components. The use of the data modeling to create randomized transformed ratings data allows for quicker identification as one does not need to compare values against every other user.

181. On information and belief, the Yandex Products comprise a recommendation system that contains a test statistic processor that calculates a test statistic based on the randomized transformed data for an item (e.g., webpage, product, etc.) (average rating of an item) and the rating that a first user gives to an item (explicit or implicit rating). A test statistic for the first common item in the data set analyzed by the Yandex Recommender System can be comprised of the first transformed ratings data and randomized transformed ratings data (probability of a

selection, p-value, confidence level, randomized transformed ratings data, randomized data from other users).

182. On information and belief, the Yandex Products comprise a recommendation system that calculates a similarity value based on the test statistic for the first and second user. For example, if a first user has clicked, liked and/or purchased webpage/item X and the average user never clicks, likes and/or purchases the webpage/item a second user who purchases the product will have a higher similarity value than an average record in the Yandex Recommendation System. Yandex documentation describes this function as "distance" "matching" and or [77]

183. On information and belief, one or more of the Yandex Products incorporate K-Nearest Neighbor and/or Naïve Bayes algorithms.

184. On information and belief, one or more of the Yandex Products generate recommendation data using an "average user," whose ratings are the average of all users' ratings.

185. On information and belief, one or more of the Yandex Products incorporate an "average user" value to improve the confidence level of recommendations.

186. On information and belief, the Yandex Products enable the collection of ratings data using an "information-gathering module."

187. On information and belief, the Yandex Products generate a numerical value as part of creating a recommendation of a product and/or content.

188. On information and belief, the Yandex Recommender System enables "similarity" scoring.

189. On information and belief, the Yandex Recommender System generates recommendations based on analyzing the entire population of users.

[77] The specification also describes the use of similarity values to determine products within a subgroup of users. "The ACF system of FIG. 6 is described in further detail below for an exemplary first user Joe. As in the previous example, the system will determine a subgroup of similar users and provide a recommendation to Joe based on the ratings provided by the users in the subgroup." '282 Patent 21:26-30.

190. On information and belief, the Yandex Recommender System uses algorithmic approaches to generate recommendations and preference data.

191. On information and belief, the Yandex Recommender System transforms data associated with a user to provide product and/or content recommendations.

192. On information and belief, Yandex has directly infringed and continues to directly infringe the '282 patent by, among other things, making, using, offering for sale, and/or selling collaborative filtering products and services, including but not limited to, the Yandex Recommender System, which include infringing content and/product recommendation technologies and have been incorporated into the webpage and product recommendations available at Yandex.com, Yandex.ru, and Yandex.Market (the "Yandex Products"). Such products and/or services include, by way of example and without limitation, Yandex.Market, which is covered by one or more claims of the '282 patent, including but not limited to claims 19 and 25.

193. By making, using, testing, offering for sale, and/or selling collaborative filtering products and services, including but not limited to the Yandex Products, Yandex has injured Fellowship Filtering and is liable to Fellowship Filtering for directly infringing one or more claims of the '282 patent, including at least claims 19 and 25, pursuant to 35 U.S.C. § 271(a).

194. On information and belief, Yandex also infringes indirectly the '282 patent by active inducement under 35 U.S.C. § 271(b).

195. On information and belief, Yandex had knowledge of the '282 patent since at least service of this Complaint or shortly thereafter, and on information and belief, Yandex knew of the '282 patent and knew of its infringement, including by way of this lawsuit.

196. On information and belief, Yandex intended to induce patent infringement by third-party customers and users of the Yandex Products and had knowledge that the inducing acts would cause infringement or was willfully blind to the possibility that its inducing acts would cause infringement. Yandex specifically intended and was aware that the normal and customary use of the accused products would infringe the '282 patent. Yandex performed the acts that constitute induced infringement, and would induce actual infringement, with the knowledge of the '282

patent and with the knowledge, or willful blindness to the probability, that the induced acts would constitute infringement. For example, Yandex provides the Yandex Products that have the capability of operating in a manner that infringe one or more of the claims of the '282 patent, including at least claims 19 and 25, and Yandex further provides documentation and training materials that cause customers and end users of the Yandex Products to utilize the products in a manner that directly infringe one or more claims of the '282 patent. By providing instruction and training to customers and end-users on how to use the Yandex Products in a manner that directly infringes one or more claims of the '282 patent, including at least claims 19 and 25, Yandex specifically intended to induce infringement of the '282 patent. On information and belief, Yandex engaged in such inducement to promote the sales of the Yandex Products, *e.g.,* through Yandex's user manuals, product support, marketing materials, and training materials to actively induce the users of the accused products to infringe the '282 patent. Accordingly, Yandex has induced and continues to induce users of the accused products to use the accused products in their ordinary and customary way to infringe the '282 patent, knowing that such use constitutes infringement of the '282 patent.

197. To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with respect to the '282 patent.

198. As a result of Yandex's infringement of the '282 patent, Fellowship Filtering has suffered monetary damages in an amount adequate to compensate for Yandex's infringement, but in no event less than a reasonable royalty for the use made of the invention by Yandex together with interest and costs as fixed by the Court.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff Fellowship Filtering respectfully requests that this Court enter:

A. A judgment in favor of Plaintiff Fellowship Filtering that Yandex has infringed, either literally and/or under the doctrine of equivalents, the ‘282 patent;

B. An award of damages resulting from Yandex’s acts of infringement in accordance with 35 U.S.C. § 284;

C. A judgment and order requiring Yandex to provide accountings and to pay supplemental damages to Fellowship Filtering, including, without limitation, prejudgment and post-judgment interest; and

D. Any and all other relief to which Fellowship Filtering may show itself to be entitled.

JURY TRIAL DEMANDED

Pursuant to Rule 38 of the Federal Rules of Civil Procedure, Fellowship Filtering requests a trial by jury of any issues so triable by right.

Dated: December 10, 2015

Respectfully submitted,

/s/ Elizabeth L. DeRieux
Elizabeth L. DeRieux (TX Bar No. 05770585)
D. Jeffrey Rambin (TX Bar No. 00791478)
CAPSHAW DERIEUX, LLP
114 E. Commerce Ave.
Gladewater, Texas 75647
Telephone: 903-845-5770
E-mail: ederieux@capshawlaw.com
E-mail: jrambin@capshawlaw.com

OF COUNSEL:

Matt Olavi (CA SB No. 265945)
Brian J. Dunne (CA SB No. 275689)
OLAVI DUNNE LLP
816 Congress Ave., Ste. 1620
Austin, Texas 78701
Telephone: 512-717-4485
Facsimile: 512-717-4495
E-mail: molavi@olavidunne.com
E-mail: bdunne@olavidunne.com

Dorian S. Berger (CA SB No. 264424)
Daniel P. Hipskind (CA SB No. 266763)
OLAVI DUNNE LLP
1880 Century Park East, Ste. 815
Los Angeles, CA 90067
Telephone: 213-516-7900
Facsimile: 213-516-7910
E-mail: dberger@olavidunne.com
E-mail: dhipskind@olavidunne.com

Attorneys for Fellowship Filtering Technologies LLC